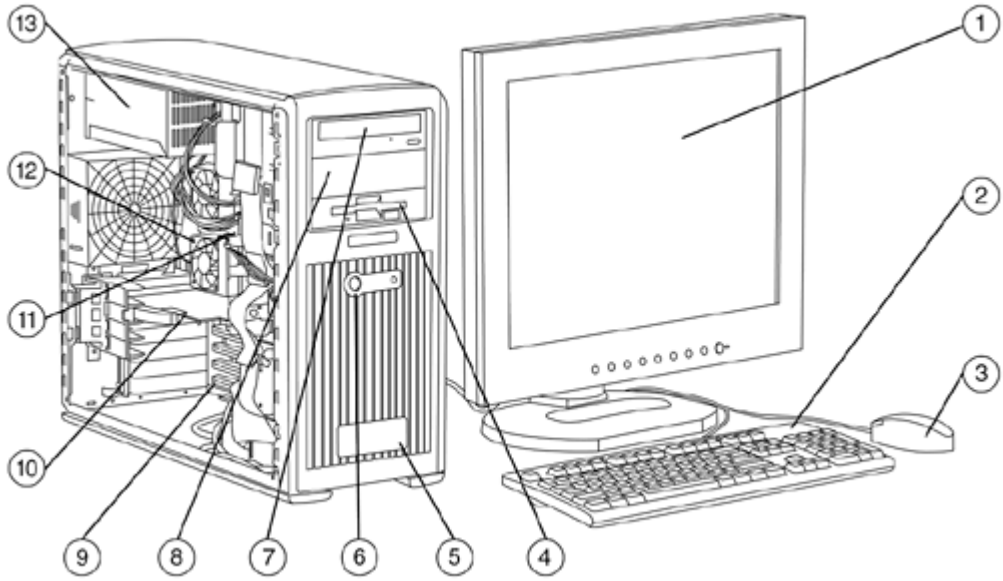
Overview

HP Workstation xw8000

HP recommends Microsoft® Windows® XP Professional



1. HP Monitor (optional)
2. HP Keyboard
3. HP Mouse
4. Floppy Drive
5. Port cover: USB, IEEE-1394, microphone, headphone
6. On-Off Button
7. Optical Drive
8. Available drive bay
9. Expansion slots
10. Graphics slot
11. Memory sockets
12. Processor
13. Power supply

At A Glance

- Supports Intel® Xeon processor, 2.4 to 3.2 GHz
- Microsoft Windows XP Professional,
  HP Installation Kit for Linux (see http://h20331.www2.hp.com/hpsub/cache/537200-0-0-225-121.html for details)
- Red Hat Linux 7.3 or Red Hat Enterprise WS 3
- Up to 1 MB L3 cache integrated on processor
- Intel E7505 chipset with dual memory channels (4.2 GB/s throughput) and 533 MHz front side bus
- PC2100 ECC registered DDR-266 expandable to 12 GB (with 2GB DIMMs)
- Integrated Ultra320 SCSI hard drives (10,000 or 15,000 rpm) and Ultra ATA/100 hard drives (7200 rpm) or optional Serial ATA Hard Drive (7200 rpm or 10,000 rpm)
- Dual Channel Ultra320 SCSI and Ultra ATA/100 controllers
- Optional 4-channel Serial ATA (SATA) RAID PCI Controller (Windows only)
- Up to 1000 GB of high-performance internal storage
- Choice of leadership graphics:
  NVIDIA Quadro NVS 280,
  NVIDIA Quadro NVS 400,
  NVIDIA Quadro4 380 XGL,
  ATI FireGL T2-128,

Overview

NVIDIA Quadro FX1100, and
NVIDIA Quadro FX3000

- Support for up to 8 displays
- Integrated Intel 10/100/1000 Mb Ethernet adapter
- Six total slots – one PCI-X 133MHz, two PCI-X 100MHz, two PCI and one AGP 8X
- Eight bays (five internal, three external)
- CD-ROM, CD-RW, DVD-ROM, or DVD+RW
- Protected by HP services, including a three-year limited warranty in many countries. Certain restrictions and exclusions apply. Three-year onsite labor not available in all countries.

Standard Features

Processor	Intel Xeon processor 2.4 GHz, 512 KB cache, 533 MHz front side bus Intel Xeon processor 2.66 GHz, 512 KB cache, 533 MHz front side bus Intel Xeon processor 2.8 GHz, 512 KB cache, 533 MHz front side bus Intel Xeon processor 3.06 GHz, 512 KB cache, 533 MHz front side bus Intel Xeon processor 3.2 GHz, 512 KB/1 MB L3 cache, 533 MHz front side bus	
Operating System	Microsoft Windows XP Professional preinstall - SP1 HP Installer Kit for Linux (supports custom installations of Red Hat 7.2, 7.3, 8.0, 9 and Enterprise Workstation Edition 3). Red Hat Enterprise Linux WS 3 (update 2)	
Cache Memory	512 KB integrated, full speed Level 2 cache per processor 1 MB integrated, full speed Level 3 cache option on the 3.2 GHz processor	
Chipset	Intel E7505 chipset	
Processor Upgradability	Upgradable to dual processor	
Memory	Standard	512-MB of PC2100 ECC registered DDR-266
	Maximum	12-GB of PC2100 ECC registered DDR-266
	NOTE: Microsoft Windows supports 4GB; Maximum configurable memory is 12GB; up to 8GB configurations are supported on Linux only (2nd processor required).	
Network Controller	Integrated Intel 10/100/1000 Mb Ethernet adapter	
Expansion Slots	I/O (Total)	6, up to 5 available
	PCI-X 1.0 64b/133MHz	1, up to 1 depending on model
	PCI-X 1.0 64b/100MHz	2, up to 2 depending on model
	PCI 2.2 32b/33MHz	2, up to 2 depending on model
	AGP 8x Pro 50 (50w)	1, up to 1 depending on model
Expansion Bays	(Total/Available)	8 total/5available
	Internal 3.5 inch	5 bays/4available
	External 5.25 inch	2 bays/1 available
	External 3.5 inch	1 external floppy drive

Standard Features

Controllers	SCSI	Integrated dual channel Ultra320 SCSI controller
	Ultra ATA/100	Integrated Ultra ATA/100
	4-channel Serial ATA	SATA RAID PCI Controller (Windows only)
Storage	Diskette Drive	1.44 MB
	Removable Media	CD-ROM, DVD-ROM, CD-RW, or DVD+ RW
	Removable Storage	128 or 256 MB HP Drive Key (USB 2.0)
	Hard Drive	40-GB, 80-GB, 160-GB, or 250-GB Ultra ATA/100 EIDE (7,200 rpm) 36-GB, or 73-GB Ultra320 SCSI (15,000 rpm); 36-GB, 73-GB, or 146-GB Ultra320 SCSI (10,000 rpm)
Interfaces	Parallel	One 25-pin (rear)
	USB 2.0	6 (2 front, 4 rear)
	Serial	One 9-pin DIN (rear)
	Ultra320 SCSI	2 (68-pin internal and optional 68-pin external)
	Ultra ATA/100	2 (internal)
	IEEE 1394	2 (1 front, 1 back)
	Keyboard (PS/2)	1 (rear)
	Pointing Device (PS/2 mouse)	1 (rear)
	Video	choice of professional graphics options
	Network	1 RJ-45 connector (rear)
	Microphone Jack	2 (front & rear)
	Headphone Jack	1 (front)
	Line-In Jack	1 (rear)
	Line-Out Jack	1 (rear)
Graphics *One of the following:*	NVIDIA Quadro NVS 280 (AGP) NVIDIA Quadro NVS 400 (AGP) NVIDIA Quadro4 380 XGL (AGP) ATI FireGL T2-128 NVIDIA Quadro FX1100 (AGP) NVIDIA Quadro FX3000 (AGP)	
Input devices	Easy Access Keyboard (PS/2)	
	3-Button Mouse (PS/2)	
Audio	AC97/16-bit stereo full-duplex and Integrated speaker	
	Sound Blaster Audigy 2 ZS PCI card	

Standard Features

Management	**Bios Features** Advanced Configuration and Power Interface (ACPI) 1.0b Desktop Management Interface (DMI) 2.0 System Management (SM) Bios 2.3.1 **NIC Hardware** Remote Wakeup Wake on LAN (WoL) **Web downloads** System Software Manager Insight Management Agent Altiris Express Remote ROM Flash Remote Shut Down
Security	Diskette write and boot control Flash ROM lock Network server mode Parallel interface control Power-on password Serial interface control Setup password Cable lock provision
Power Supply	450 watts, with Power Factor Correction
Service and Support	Protected by HP services including a three-year, limited warranty with three-year parts coverage, three year, on-site service, and three-year labor (in many countries); 7 x 24 hardware technical phone support and on-line support through the Internet; Pre-Failure Warranty coverage of hard drives, memory. **NOTE:** Certain restrictions and exclusions apply. Consult the customer support center for details. Three-year, onsite and labor not available in all countries.

Standard Features Pre-Configured Global Models

X8X/2.4/36S/512/Xd	**Processor**	Intel Xeon processor 2.4 GHz
DS729AW#ABA	**Operating System**	Microsoft Windows XP Professional
	Cache Memory	512 KB integrated L2
	Memory	512MB (2x256 MB) PC2100 ECC registered DDR-266
	Optical Drive	16X/40X DVD-ROM Drive
	Hard Drive	36 GB Ultra320 SCSI (10,000 rpm)
	Graphics	**Not included in base configuration** – Please choose a graphics card option below: NVIDIA Quadro NVS 280 NVIDIA Quadro NVS 400 NVIDIA Quadro4 380 XGL ATI FireGL T2-128 NVIDIA Quadro FX1100 NVIDIA Quadro FX3000 **NOTE:** Please see Part Numbers in After market options/Standalone accessories section.
	Mouse	HP 3-button mouse (PS/2)

X8X/2.8/36S/512/Xd	**Processor**	Intel Xeon processor 2.8 GHz
DS731AW#ABA	**Operating System**	Microsoft Windows XP Professional
	Cache Memory	512 KB integrated L2
	Memory	512MB (2x256 MB) PC2100 ECC registered DDR-266
	Optical Drive	16X/40X DVD-ROM Drive
	Hard Drive	36 GB Ultra320 SCSI (10,000 rpm)
	Graphics	**Not included in base configuration** – Please choose a graphics card option below: NVIDIA Quadro NVS 280 NVIDIA Quadro NVS 400 NVIDIA Quadro4 380 XGL ATI FireGL T2-128 NVIDIA Quadro FX1100 NVIDIA Quadro FX3000 **NOTE:** Please see Part Numbers in After market options/Standalone accessories section.
	Mouse	HP 3-button mouse (PS/2)

Standard Features Pre-Configured Global Models

X8X/3.06/36S/512/Xd	**Processor**	Intel Xeon processor 3.06 GHz
DS732AW#ABA	**Operating System**	Microsoft Windows XP Professional
	Cache Memory	512 KB integrated L2
	Memory	512MB (2x256 MB) PC2100 ECC registered DDR-266
	Optical Drive	16X/40X DVD-ROM Drive
	Hard Drive	36 GB Ultra320 SCSI (10,000 rpm)
	Graphics	**Not included in base configuration** – Please choose a graphics card option below: NVIDIA Quadro NVS 280 NVIDIA Quadro NVS 400 NVIDIA Quadro4 380 XGL ATI FireGL T2-128 NVIDIA Quadro FX1100 NVIDIA Quadro FX3000 **NOTE:** Please see Part Numbers in After market options/Standalone accessories section.
	Mouse	HP 3-button mouse (PS/2)

Configure to order options

Processor	Intel Pentium 4 processor 2.4-GHz, 512-KB cache, 533-MHz system bus Intel Pentium 4 processor 2.66-GHz, 512-KB cache, 533-MHz system bus Intel Pentium 4 processor 2.8-GHz, 512-KB cache, 533-MHz system bus Intel Pentium 4 processor 3.06-GHz, 512-KB cache, 533-MHz system bus Intel Xeon processor 3.2-GHz/533-MHz front side bus, 1-MB L3 cache 2nd Xeon processor 2.4-GHz, 512-KB cache, 533-MHz front side bus 2nd Xeon processor 2.66-GHz, 512-KB cache, 533-MHz front side bus 2nd Xeon processor 2.8-GHz, 512-KB cache, 533-MHz front side bus 2nd Xeon processor 3.06-GHz, 512-KB cache, 533-MHz front side bus 2nd Intel Xeon processor 3.2-GHz/533-MHz front side bus, 1-MB L3 cache **NOTE:** When adding an additional processor, both processors must have the same speed and cache size.
Operating System	Windows XP Professional SP1a preloaded; incl. Windows XP recovery CD HP Installer Kit for Linux Red Hat Enterprise Linux WS Edition 3.0 (32-bit Update 2)
Memory (DDR-SDRAM)	256-MB PC2100 ECC registered DDR-266 512-MB PC2100 ECC registered DDR-266 1-GB PC2100 ECC registered DDR-266 1.5-GB PC2100 ECC registered DDR-266 2-GB PC2100 ECC registered DDR-266 3-GB PC2100 ECC registered DDR-266 4-GB PC2100 ECC registered DDR-266 6-GB PC2100 ECC registered DDR-266 (available on Linux models with 2nd processor only) 8-GB PC2100 ECC registered DDR-266 (available on Linux models with 2nd processor only) **NOTE:** Microsoft Windows supports 4GB; Maximum configurable memory is 12GB; up to 8GB configurations are supported on Linux only (2nd processor required). Memory must be added in like pairs.
Monitors	HP L1925 19-inch TFT Flat Panel Display – Analog/Digital HP L2035 20-inch TFT Flat Panel Display HP L2335 23-inch TFT Widescreen Flat Panel Display HP p1230 22-inch (20.0-inch vis) Performance Natural-flat CRT Monitor

Configure to order options

Graphic Card (Video Card)	NVIDIA Quadro NVS 280 (AGP) NVIDIA Quadro NVS 400 (AGP) for Windows models only NVIDIA Quadro4 380 XGL (AGP) ATI FireGL T2-128 (AGP) NVIDIA Quadro FX1100 (AGP) NVIDIA Quadro FX3000 (AGP) for Windows models only
Primary hard disks (* SATA drives work with Windows models only)	40-GB Ultra ATA/100 EIDE (7,200 rpm) 80-GB Ultra ATA/100 EIDE (7,200 rpm) 160-GB Ultra ATA/100 EIDE (7,200 rpm) 250-GB Ultra ATA/100 EIDE (7,200 rpm) 80-GB Serial ATA/150 (7,200 rpm)* 160-GB Serial ATA/150 (7,200 rpm)* 250-GB Serial ATA/150 (7,200 rpm)* 36-GB Serial ATA/150 (10,000 rpm)* 74-GB Serial ATA/150 (10,000 rpm)* 36-GB Ultra320 SCSI (10,000 rpm) 73-GB Ultra320 SCSI (10,000 rpm) 146-GB Ultra320 SCSI (10,000 rpm) 36-GB Ultra320 SCSI (15,000 rpm) 73-GB Ultra320 SCSI (15,000 rpm)
Secondary hard disks	40-GB Ultra ATA/100 EIDE (7,200 rpm) 80-GB Ultra ATA/100 EIDE (7,200 rpm) 160-GB Ultra ATA/100 EIDE (7,200 rpm) 250-GB Ultra ATA/100 EIDE (7,200 rpm) 80-GB Serial ATA/150 (7,200 rpm)* 160-GB Serial ATA/150 (7,200 rpm)* 250-GB Serial ATA/150 (7,200 rpm)* 36-GB Serial ATA/150 (10,000 rpm)* 74-GB Serial ATA/150 (10,000 rpm)* 36-GB Ultra320 SCSI (10,000 rpm) 73-GB Ultra320 SCSI (10,000 rpm) 146-GB Ultra320 SCSI (10,000 rpm) 36-GB Ultra320 SCSI (15,000 rpm) 73-GB Ultra320 SCSI (15,000 rpm)

Configure to order options

Third hard disks	80-GB Serial ATA/150 (7,200 rpm)* 160-GB Serial ATA/150 (7,200 rpm)* 250-GB Serial ATA/150 (7,200 rpm)* 36-GB Serial ATA/150 (10,000 rpm)* 74-GB Serial ATA/150 (10,000 rpm)* 36-GB Ultra320 SCSI (10,000 rpm) 73-GB Ultra320 SCSI (10,000 rpm) 146-GB Ultra320 SCSI (10,000 rpm) 36-GB Ultra320 SCSI (15,000 rpm) 73-GB Ultra320 SCSI (15,000 rpm)
4th hard disks	80-GB Serial ATA/150 (7,200 rpm)* 160-GB Serial ATA/150 (7,200 rpm)* 250-GB Serial ATA/150 (7,200 rpm)* 36-GB Serial ATA/150 (10,000 rpm)* 74-GB Serial ATA/150 (10,000 rpm)* 36-GB Ultra320 SCSI (10,000 rpm) 73-GB Ultra320 SCSI (10,000 rpm) 146-GB Ultra320 SCSI (10,000 rpm) 36-GB Ultra320 SCSI (15,000 rpm) 73-GB Ultra320 SCSI (15,000 rpm)
5th hard disks (SCSI only)	36-GB Ultra320 SCSI (10,000 rpm) 73-GB Ultra320 SCSI (10,000 rpm) 146-GB Ultra320 SCSI (10,000 rpm) 36-GB Ultra320 SCSI (15,000 rpm) 73-GB Ultra320 SCSI (15,000 rpm)
Optical Drives	48X CD-ROM 48X CD-RW 16X DVD-ROM 48X CD-RW/DVD-ROM combo 4.7-GB 8X DVD+RW for Windows models only

Configure to order options

Removable storage	128 MB HP Drive Key (USB 2.0) 256 MB HP Drive Key (USB 2.0)
Input devices	Easy Access Keyboard (PS/2) No Keyboard Kit 3-Button Mouse (PS/2) Scroll Mouse (PS/2) No Mouse Option
External SCSI connector	Ultra320 SCSI back panel connect on chassis (2nd channel of dual-channel Ultra320)

After market options/Standalone accessories

		Part Number
2nd Processor	Intel Xeon processor 2.4 GHz, 512 KB cache, 533 MHz front side bus	AA661A
	Intel Xeon processor 2.66 GHz, 512 KB cache, 533 MHz front side bus	AA662A
	Intel Xeon processor 2.8 GHz, 512 KB cache, 533 MHz front side bus	AA663A
	Intel Xeon processor 3.06 GHz, 512 KB cache, 533 MHz front side bus	AA849A
	Intel Xeon processor 3.06 GHz, 512 KB L2/1 MB L3 cache, 533 MHz front side bus	DG154A
	Intel Xeon processor 3.2 GHz, 1 MB L3, 533 MHz front side bus cache	DP042A
	NOTE: When adding an additional processor, both processors must have the same speed and cache size.	
Operating System	Red Hat Enterprise Linux WS 3.0 (32-bit Update 2)	PD862A
Memory	256 MB (1x256) PC2100 ECC registered DDR-266	DQ744A
	512 MB PC2100 ECC registered DDR-266	AA656A
	1 GB PC2100 ECC registered DDR-266	AA657A
	2 GB PC2100 ECC registered DDR-266	AA834A
	NOTE: Microsoft Windows supports 4GB; Maximum configurable memory is 12GB; up to 8GB configurations are supported on Linux only. Memory must be added in like pairs.	
Graphics	NVIDIA Quadro NVS 280 (AGP)	AA931A
	NVIDIA Quadro NVS 280 DVI Cables	DL929A
	NVIDIA Quadro NVS 400 (AGP) for Windows models only	AA605A
	NVIDIA Quadro NVS 400 DVI Cables	AA606A
	NVIDIA Quadro4 380 XGL (AGP)	AA653A
	ATI FireGL T2-128 (AGP)	AA929A
	NVIDIA Quadro FX1100 (AGP)	DL489A
	NVIDIA Quadro FX3000 (AGP) for Windows models only	DL488B

After market options/Standalone accessories

Hard Drives	***Ultra ATA/100 Drives***	
	40-GB ATA/100 EIDE (7,200 rpm)	DC180A
	80-GB ATA/100 EIDE (7,200 rpm)	DC181A
	160-GB Ultra ATA/100 EIDE (7,200 rpm)	DC189A
	250-GB Ultra ATA/100 EIDE (7,200 rpm)	DC516A
	Serial ATA Drives (for Windows models only)	
	80-GB Serial ATA Hard Drive (7200 rpm)	DE705A
	160-GB Serial ATA Hard Drive (7200 rpm)	DE706A
	250-GB Serial ATA/150 Hard Drive (7200 rpm)	DS702A
	36-GB Serial ATA Hard Drive (10,000 rpm)	DU962A
	74-GB Serial ATA Hard Drive (10,000 rpm)	DX760A
	Ultra320 SCSI Drives	
	36-GB Ultra320 SCSI (10,000 rpm)	AA612A
	73-GB Ultra320 SCSI (10,000 rpm)	AA613A
	146-GB Ultra320 SCSI (10,000 rpm)	AA614A
	36-GB Ultra320 SCSI (15,000 rpm)	AA616A
	73-GB Ultra320 SCSI (15,000 rpm)	AA617A
Optical Drives	48X CD-ROM Drive	DC143B
	48X/24X/48X CD-RW Drive	DE205A
	16X DVD Drive	AA620A
	48X CD-RW/DVD-ROM combo drive	DE206A
	4.7GB 8X DVD+R/RW Drive – 400i for Windows models only	DS703A
Removable Storage	128 MB HP Drive Key (USB 2.0)	DQ819B
	256 MB HP Drive Key (USB 2.0)	DL973B
Storage Controllers	Ultra320 Dual Channel SCSI Controller Card (PCI) cable sold separately	AA611A
	Ultra320 SCSI back panel connect on chassis (2nd channel of dual-channel U320) cable sold separately. Uses HDCI, HD68, or mini DB680 connector.	AA658A
	4-channel Serial ATA (SATA) RAID PCI Controller (A power cable is needed for every 2 drives. Power cords sold separately.)	DM294A
	Cable, SATA power (1 required for every 2 SATA drives)	DN733A
	Adaptec SCSI RAID 2120S Card (cable sold separately)	AA850A
	5-device SCSI cable	AA818A

After market options/Standalone accessories

Rack Options	Rack mounting kits	AA640A
	Fixed shelf kit	253449-B21
	Sliding Shelf Kit	234672-B21
	Depth Adjustable Rails	332558-B21
Backup Devices	Exabyte 33/66 GB VXA-1 IDE Tape Drive	237109-B22
	Exabyte 33/66 GB VXA-1 SCSI Tape Drive	237108-B22
	TR5 10/20 GB iTape Drive (IDE, carbon)	294243-B22
	Iomega ZIP 250 MB (internal, IDE, carbon)*	294416-B22
	HP DAT24i Internal DDS3 tape drive	C1555D
	HP DAT24e External DDS3 tape drive	C1556D
	HP DAT40i Internal DDS4 tape drive	C5686B
	HP DAT40e External DDS4 tape drive	C5687C
	HP DAT72i Internal DAT72 tape drive	Q1522A
	HP DAT72e External DAT72 tape drive	Q1523A
Communications	Intel Pro/1000 XT Server Adapter Gigabit PCI card	AA660A
	Intel Pro 1000 MT NIC	DC193A
	Broadcom Gigabit NIC	DC194A
Input devices	PS/2 Easy Access keyboard (carbonite)	DC167B
	Three button mouse-carbon (PS2)	AA778A
	Scroll Mouse-Carbon (PS2)	DD440B
	Spaceball 5000	DE934A
Security	USB Fingerprint Identification	240238-B21
	USB SmartCard Keyboard	267147-008
	Corvadis USB Enhanced SmartCard Reader	240154-B21
Other	Expansion kit	AA857A
	Remote Workstation Sender Software Module	DM497A
	Remote Workstation Receiver Software Module	DM498A
	Sound Blaster Audigy 2 ZS	DV440A
Monitors	HP L1925 19-inch TFT Flat Panel Display – Analog/Digital	P9626A#ABA
	HP L2035 20-inch TFT Flat Panel Display	P9614A#ABA
	HP L2335 23-inch TFT Widescreen Flat Panel Display	P9615A#ABA
	HP p1230 22-inch (20.0-inch vis) Performance Natural-flat CRT Monitor	P9613A#ABA

Memory

Standard Memory

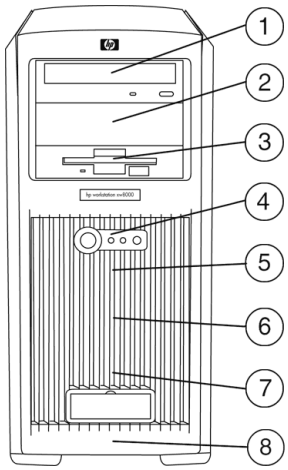
This system supports PC-2100 DDR-266 DDR-SDRAM ECC. The mainboard is based on the E7505 chipset and has 6 DIMM slots with dual memory channels (4.2 GB/s throughput). It ships with 512-MB as standard. It can support a maximum of 12-GB of RAM when optional memory upgrades are included. Memory must be installed in like pairs. Only 266-MHz memory speed is supported.

NOTE: Microsoft Windows supports 4GB; Maximum configurable memory is 12GB; up to 8GB configurations are supported on Linux only (2nd processor required).

These memory options are available from HP:	Part Number
• 256 MB upgrade kit PC2100 ECC registered DDR-266	DQ744A
• 512 MB upgrade kit PC2100 ECC registered DDR-266	AA656A
• 1 GB upgrade kit PC2100 ECC registered DDR-266	AA657A
• 2 GB upgrade kit PC2100 ECC registered DDR-266	AA834A

Storage

Drive Bay Locations



Drive Support

	Quantity Supported	Position Supported	Controller
Removable Media			
1.44-MB Diskette Drive	Up to 1	3	Integrated
Optical Drives	Up to 2		
CD-ROM Drive		1, 2	Integrated Ultra ATA/100
DVD-ROM Drive		1, 2	Integrated Ultra ATA/100
CD-RW Drive		1, 2	Integrated Ultra ATA/100
16x CD-RW/DVD-ROM		1, 2	Integrated Ultra ATA/100
DVD+RW		1, 2	Integrated Ultra ATA/100

Storage

Hard Drives

Ultra320 SCSI Drives			
1-inch	Up to 5	4, 5, 6, 7, 8	Integrated dual channel Ultra320 SCSI controller
36-GB 10,000 rpm 73-GB 10,000 rpm 146-GB 10,000 rpm 36-GB 15,000 rpm 73-GB 15,000 rpm			
Ultra ATA Drives			
1-inch	Up to 2	5, 6	Integrated Ultra ATA/100 controller
40-GB 7200 rpm 80-GB 7200 rpm 160-GB 7200 rpm 250-GB 7200 rpm			
Serial ATA Drives (for Windows models only)	Up to 4	1, 2, 4, 5	4-channel Serial ATA (SATA) RAID PCI Controller
80-GB (7200 rpm) 160-GB (7200 rpm) 250-GB (7200 rpm) 36-GB (10,000 rpm) 74-GB (10,000 rpm)	Up to 4	1, 2, 4, 5	4-channel Serial ATA (SATA) RAID PCI Controller

Maximum Storage Capacity

Internal	730-GB SCSI (assumes 5 SCSI drives installed) 500-GB Ultra ATA 1000 GB for SATA

Technical Specifications

Base Workstation	**System Characteristics**	Processor	Intel Xeon	
		CPU Bus Speed Supported	533 MHz front side bus	
		Standard Cache	512 KB integrated, full speed Level 2 1 MB integrated, full speed Level 3 cache with 3.2GHz model processors only Upgradeable to up to 2 processors	
		System board with Intel E7505 chipset	Yes	
	Expansion Options	Memory Expansion Slots	6 DIMMs	
		Memory Type Supported	PC2100 ECC registered DDR-266 only	
		Maximum Memory	12-GB	
		Expansion Slots	I/O (Total)	6, up to 5 available
			PCI-X 1.0 64b/133MHz	1, up to 1 depending on model
			PCI-X 1.0 64b/100MHz	2, up to 2 depending on model
			PCI 2.2 32b/33MHz	2, up to 2 depending on model
			AGP 8x Pro 50 (50w)	1, up to 1 depending on model
		Expansion Bays	(Total/Available)	8 total/5 available
			Internal 3.5 inch	5 bays/4 available
			External 5.25 inch	2 bays/1 available
			External 3.5 inch	1 external floppy drive
	Interfaces	Parallel	One 25-pin (rear)	
		USB 2.0	6 (2 front, 4 rear)	
		Serial	One 9-pin DIN (rear)	
		Ultra320 SCSI	2 (68-pin internal and optional 68-pin external)	
		Ultra ATA/100	2 (internal)	
		IEEE 1394	2 (1 front, 1 back)	
		Keyboard (PS/2)	1 (rear)	
		Pointing Device (PS/2 mouse)	1 (rear)	
		Video	choice of professional graphics options	
		Network	1 RJ-45 connector (rear)	
		Microphone Jack	2 (front & rear)	
		Headphone Jack	1 (front)	
		Line-In Jack	1 (rear)	
		Line-Out Jack	1 (rear)	
	System Unit	Tower Dimensions (HxWxD)	17.7 x 8.3 x 20.3 in (44.9 x 21 x 51.5 cm)	

	Weight (standard configuration)	40 lb (18 kg)	
	Power Supply	Operating Voltage Range	100 VAC to 240 VAC
		Rated Voltage Range	100 VAC to 120 VAC; 200 VAC to 240 VAC
		Rated Line Frequency	50-Hz to 60-Hz
		Rated Input Current	6.4A @ 100 VAC; 3.2A @ 240 VAC
		Maximum Rated Power	692-Watt input, 450-Watt output
		Physical Dimensions	3.85 x 6.3 x 7.35 in (9.78 x 16 x 18.67 cm)
		Weight	<5.7 lb (<2.6 kg)
	Temperature (Values are subject to change)	Operating	50° to 95° F (10° to 35° C)
		Non-operating	-40° to 158° F (-40° to 70° C)
	Humidity (non-condensing) (Values are subject to change)	Operating	15% to 80%
		Non-operating	10% to 90%
	Maximum Altitude (nonpressurized)	Operating	10000 ft (3100 m max)
		Non-operating	15000 ft (4600 m max)
HP Easy Access Keyboard	**Dimensions** (HxWxD)	18.3 x 6.3 x 1.4 in (46.48 x 16.0 x 3.56 cm)	
	Weight	Approximately 2 lb (0.9 kg)	
	Input Specifications	Operating Voltage	+ 5VDC ± 5%
		Power Consumption	50 mA maximum (with 3 LEDs on)
		System Interface	PS/2 mini-din connector
		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		PC98	Functionally compliant
	Mechanical	Languages	18 available
		Keycaps	Low-profile design
		Switch Actuation	55 g nominal peak force with tactile feedback
		Switch Life	20 million keystrokes (using Hasco modified tester)
		Switch Type	Contamination resistant membrane
		Key Leveling Mechanism	For all double wide and greater length keys
		Cable Length	6 ft (1.8 m)
		PC98-99	Mechanically compliant

	Environmental	Acoustics	50 dBA maximum sound pressure level
		Operating Temperature	50° to 122° F (10° to 50° C)
		Non-operating Temperature	-22° to 140° F (-30° to 60° C)
		Operating Humidity	10% to 90% (non condensing at ambient)
		Non-operating Humidity	20% to 80% (non condensing at ambient)
		Operating Shock	40 g, 6 surfaces
		Non-operating Shock	80 g, 6 surfaces
		Operating Vibration	2 g peak acceleration
		Non-operating Vibration	50° to 122° F (10° to 50° C)
1.44-MB Diskette Drive	**Size**	3.5 in (8.89 cm)	
	LED Indicators (front panel)	Green	
	Read/Write Capacity per Diskette (high/low)	1.44 MB/720 KB	
	Drive Height	One-third	
	Drive Rotation	300 rpm	
	Transfer Rate (high/low)	500/250 KB/s	
	Bytes/Sector	512	
	Sectors/Track (high/low)	18/9	
	Tracks/Side (high/low)	80/80	
	Access Times	Track-to-Track (high/low)	3/6 ms
		Average (high/low)	94/173 ms
		Settling Time	15 ms
		Latency Average	100 ms
	Cylinders (high/low)	80/80	
	Read/Write Heads	Two	

Technical Specifications

HP 3-Button Mouse	**Dimensions/Weight**	Height	1.42 in (3.6 cm)
		Length	4.17 in (10.7 cm)
		Width	2.87 in (7.4 cm)
		Weight	5.20 oz (150 g)
	Environmental	Operating Temperature	32° to 104° F (0° to 40° C)
		Non-operating Temperature	-4° to 140° F (-20° to 60° C)
		Operating Humidity	10% to 90% (non condensing at ambient)
	Mechanical	Resolution	400 ± 20% DPI
		Tracking Speed	10 in/s Maximum
		Switch Life	1,000,000 operations (using Hasco modified tester)
		Switch Type	Micro-switches
		Tracking Mechanism Life	155 miles (250 km) at average speed of 10 in/s
		Cable Length	6 ft (1.8 m)
		PC98-99	Mechanically compliant
	Regulatory Approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick
HP 2-Button Scroll Mouse	**Scroll Wheel**	8 mm	
	Maximum Rotation Speed	30 mm/s	
	Switch Type	Light force micro-switch	
	Switch Life	1 million operations	
	Mechanical Life	Minimum 200,000 revolutions	
	Environmental	Operating Temperature	50° to 122° F (10° to 50° C)
		Non-operating Temperature	-22° to 140° F (-30° to 60° C)
		Operating Humidity	10% to 90% (non condensing at ambient)
		Non-operating Humidity	20% to 80% (non condensing at ambient)
		Operating Shock	40 g, 6 surfaces
		Non-operating Shock	80 g, 6 surfaces
		Operating Vibration	2 g peak acceleration
		Non-operating Vibration	4 g peak acceleration
	Electrical	Operating Voltage	+ 5VDC ± 10%
		Power Consumption	15mA
		System Consumption	PS/2 mini-din connector
		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		PC98	Functionally compliant

Technical Specifications

	Mechanical	Resolution	400 ± 20% DPI
		Tracking Speed	10 in/s Maximum
		Acceleration	100 in/s
		Switch Actuation	85 g nominal peak force
		Switch Life	1,000,000 operations (using Hasco modified tester)
		Cable Length	2 m
		PC98-99	Mechanically compliant
	Regulatory Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C -Tick	
SpaceBall 5000	**Features**	Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw)	
	Ball Diameter	2.2 in (5.6 cm)	
	Dimensions/Weight	Height	3.0 in (7.6 cm)
		Length	6.0 in (15.2 cm)
		Width	8.4 in (21.3 cm)
		Weight	2.1 lb (9.94 kg)
	Environmental	Operating Temperature	50° to 104° F (10° to 40° C)
		Non-operating Temperature	43° to 140° F (6° to 60° C)
		Operating Humidity	8% to 80% (non-condensing at ambient)
		Non-operating Humidity	5% to 80% (non-condensing at ambient)
	Mechanical	Force range	0.5 - 8.2N (1.8 – 29.5 oz)
		Torque range	0.085 – 0.33 oz-in. (6.91 Nmm)
		Resolution	10 bits
	Serial Specifications	Connector	9-pin D-subminiature receptacle (DB9S)
		Cable Length	12.8 ft. (3.9 m)
		Data rate	9600 bps
		Flow control	Xon/Xoff
	Regulatory Approvals	Compliant	UL, cUL, EN 950, EN 60950, CSA, FCC, CE Mark, TUV, CISPR 22, EN 50082, IEC 1000 4-2, IEC 1000-4-3, AS/NZS, VCCI, BSMI, C-Tick

Technical Specifications

Adaptec SCSI RAID 2120S Card	**Dimensions** (H x D)	2.5 x 6.6 in (6.4 x 16.8 cm) Low profile card
	RAID Level	0, 1, 10, 5, JBOD
	Data Transfer Rate	Up to 320 MB/s
	Cache Memory	64 MB (onboard)
	Device Support	Up to 15 SCSI devices
	Bus Type	64-bit/66MHz PCI (Also support 32-bit/33MHz PCI)
	Internal Connectors	One 68-pin high-density
	External Connectors	One 68-pin VHDCI
	System Requirements	Intel PC or equivalent with available PCI slot
	Operating Temperature	32°to 131° F (0°to 55° C)
	Power Requirements	4 amps @ +5V
	Operating System Support	Windows 2000 Professional, Windows XP Professional
	Other	Optimized disk utilization Online RAID Level Migration Online capacity expansion Immediate RAID availability (background initialization) S.M.A.R.T. support

4-channel Serial ATA (SATA) **RAID PCI Controller**	**Dimensions** (H x D)	2.375 x 5.5 in (6 x 14 cm)
	RAID level	RAID 0+1 striping/mirroring; RAID 1 mirroring; RAID 0 striping
	Data Transfer Rate	Up to 266MB/sec (66 MHz PCI); Up to 133MB/sec (33 MHz PCI)
	Cache Memory	64 MB (onboard)
	Device Support	Up to (4) Serial ATA/150 Drives
	Bus Type	32-bit 33/66MHz PCI bus; PCI 2.3 compliant
	BIOS	Optimizes drive performance by drive type; flashable for future upgrades; supports multiple arrays; boots system from any array; BBS compliant; setup menus for custom array creation
	48-bit LBA Support	Recognizes drive capacities exceeding 137GB each
	Data Protection Features	Mirrors data to second drive or drive pair for RAID 1 and RAID 0+1; offers hot spare support for instant rebuild of failed drive in 2-drive RAID 1
	Advanced Data Features	Bus mastering offloads data I/O handling from host CPU; CRC error-checking of Serial ATA and Ultra ATA drives for data reliability during transfers; tagged command queuing and elevator seek for optimized data handling
	ACPI Support	S1, S3, & S4
	Internal Connectors	4 standard 7-pin SATA connectors
	External Connectors	None
	System Requirements	Intel PC or equivalent with available PCI slot
	Operating Temperature	32° F to 131° F (0° C to 55° C)
	Power Requirements	4 amps @ +5V

Technical Specifications

Operating System Support	Windows 2000 Professional, Windows XP Professional and RedHat Linux	
Other	Optimized disk utilization	
	Monitors status of arrays, hard drives, and controller via TCP/IP	
	Synchronizes data in fault-tolerant arrays	
	Email notification for specified array events	
	S.M.A.R.T. support	

NOTE: For Windows models only. A power cable is needed for every 2 drives. Power cords sold separately.

Ultra ATA Hard Drives	**40 GB, 4200rpm**	**Capacity**	40 GB	
		Height	1.0 in (2.54 cm)	
		Width	2.75 in (8.9 cm)	
		Interface	Ultra ATA/100	
		Synchronous Transfer Rate (Maximum)	100 MB/s	
		Seek time (typical reads, including settling)	Single track	3 ms
			Average	13 ms
			Full-stroke	24.0 ms
		Rotational speed	4200 rpm	
		Logical blocks	78,140,160	
		Operating temperature	41° to 131° F (5° to 55° C)	
		Average rotational latency	4.2 ms	
	80 GB, 7200rpm	**Capacity**	80 GB	
		Height	1.0 in (2.54 cm)	
		Width	3.5 in (8.9 cm)	
		Interface	Ultra ATA/100	
		Synchronous Transfer Rate (Maximum)	100 MB/s	
		Seek time (typical reads, including settling)	Single track	0.8 ms
			Average	9.0 ms
			Full-stroke	17.0 ms
		Rotational speed	7200 rpm	
		Logical blocks	156,301,488	
		Operating temperature	41° to 131° F (5° to 55° C)	
		Average rotational latency	4.2 ms	
	160 GB, 7200rpm	**Capacity**	160 MB	

		Height	1.0 in (2.54 cm)	
		Width	3.5 in (8.9 cm)	
		Interface	Ultra ATA/100	
		Synchronous Transfer Rate (Maximum)	100 MB/s	
		Seek time (typical reads, including settling)	Single track	0.8 ms
			Average	< 9.1 ms
			Full-stroke	17.0 ms
		Rotational speed	7200 rpm	
		Logical blocks	320,173,056	
		Operating temperature	41° to 131° F (5° to 55° C)	
		Average rotational latency	4.2 ms	
	250 GB, 7200rpm	**Capacity**	250 GB	
		Height	1.0 in (2.54 cm)	
		Width	3.5 in (8.9 cm)	
		Interface	Ultra ATA/100	
		Synchronous Transfer Rate (Maximum)	100 MB/s	
		Seek time (typical reads, including settling)	Single track	0.8 ms
			Average	9.0 ms
			Full-stroke	17.0 ms
		Rotational speed	7200 rpm	
		Logical blocks	488,397,168	
		Operating temperature	41° to 131° F (5° to 55° C)	
Ultra320 SCSI Hard Drives	**36 GB, 10K rpm**	**Capacity**	36,400 MB	
		Height	1.0 in (2.54 cm)	
		Width	3.5 in (8.9 cm)	
		Interface	Ultra320 SCSI	
		Transfer rate synchronous (maximum)	320 MB/s	
		Seek time (typical reads, including settling)	Single track	0.6 ms
			Average	4.5 ms
			Full-stroke	11.0 ms
		Rotational speed	10,000 rpm	
		Logical blocks	71,631,920	
		Operating temperature	41° to 131° F (5° to 55° C)	

Technical Specifications

	73 GB, 10K rpm	**Capacity**	73,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	3.5 in (8.9 cm)	
		Interface	Ultra320 SCSI	
		Transfer rate synchronous (maximum)	320 MB/s	
		Seek time (typical reads, including settling)	Single track	0.55 ms
			Average	4.9 ms
			Full-stroke	9.2 ms
		Rotational speed	10,000 rpm	
		Logical blocks	143,374,744	
		Operating temperature	41° to 131° F (5° to 55° C)	
	146 GB, 10K rpm	**Capacity**	146,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	3.5 in (8.9 cm)	
		Interface	Ultra320 SCSI	
		Transfer rate synchronous (maximum)	320 MB/s	
		Seek time (typical reads, including settling)	Single track	0.55 ms
			Average	4.9 ms
			Full-stroke	9.2 ms
		Rotational speed	10,000 rpm	
		Logical blocks	143,374,744	
		Operating temperature	41° to 131° F (5° to 55° C)	
	73 GB, 15K rpm	**Capacity**	73,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	3.5 in (8.9 cm)	
		Interface	Ultra320 SCSI	
		Transfer rate synchronous (maximum)	320 MB/s	
		Seek time (typical reads, including settling)	Single track	0.4 ms
			Average	3.8 ms
			Full-stroke	6.7 ms
		Rotational speed	15,000 rpm	
		Logical blocks	143,337,744	
		Operating temperature	41° to 131° F (5° to 55° C)	
Serial ATA Hard Drives	**80 GB, 7200rpm**	**Capacity**	85,899,345,920 bytes	

Technical Specifications

(Windows or Linux models only)	**Height**	1.0 in (2.54 cm)	
	Width	3.5 in (8.9 cm)	
	Interface	SATA	
	Synchronous Transfer Rate (Maximum)	150 MB/s	
	Buffer	8 MB	
	Seek time (typical reads, includes controller overhead, including settling)	Single track	0.9 ms
		Average	9.3 ms
		Full-stroke	9.2 ms
	Rotational speed	7,200 rpm	
	Logical blocks	160,086,528	
	Operating temperature	41° to 131° F (5° to 55° C)	
160 GB, 7200rpm	**Capacity**	171,798,691,840 bytes	
	Height	1.0 in (2.54 cm)	
	Width	4 in (10.2 cm)	
	Interface	SATA	
	Synchronous Transfer Rate (Maximum)	150 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.9 ms
		Average	9.3 ms
		Full-Stroke	20 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	320,173,056	
	Operating Temperature	41° to 131° F (5° to 55° C)	
250 GB, 7200rpm	**Capacity**	250,000,000,000 bytes	
	Height	1 in (2.6 cm)	
	Width	Media diameter: 3.5 in (8.9.x cm)	
		Physical size: 4 in (10.2 cm)	
	Interface	SATA	
	Synchronous Transfer Rate (Maximum)	150 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.8 ms
		Average	<9.0 ms
		Full-Stroke	<17.0 ms
	Rotational Speed	7,200 rpm	

	Logical Blocks	490,234,752	
	Operating Temperature	41° to 131° F (5° to 55° C)	
36 GB, 10K rpm	**Capacity**	37,019,566,080 bytes	
	Height	1.028 in (25.4 mm)	
	Width	Media diameter: 3.3 in (84mm) Physical size: 4 in (10.2 cm)	
	Interface	ESATA	
	Synchronous Transfer Rate (Maximum)	150 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.3 ms
		Average	5.2 ms
		Full-Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	72,303,840	
	Operating Temperature	41° to 131° F (5° to 55° C)	
74 GB, 10K rpm	**Capacity**	74,355,769,344 bytes	
	Height	1.028 in (25.4 mm)	
	Width	Media diameter: 3.3 in (84mm) Physical size: 4 in (10.2 cm)	
	Interface	ESATA	
	Synchronous Transfer Rate (Maximum)	150 MB/s	
	Buffer	8 MB	
	Seek time (typical reads, includes controller overhead, including settling)	Single track	0.3 ms
		Average	4.5 ms
		Full-stroke	10.2 ms
	Rotational speed	10,000 rpm	
	Logical blocks	145,226,112	
	Operating temperature	41° to 131° F (5 to 55° C)	

Technical Specifications

48X CD-ROM Drive	**Capacity**	650 MB CD disc	
	Dimensions (HxWxD)	1.7 x 5.9 x 8.0 in (4.3 x 15.0 x 20.3 cm)	
	Weight	2.6 lb (1200 g)	
	Interface	ATAPI	
	Mounting Orientation	Horizontal	
	Data Transfer Rates - Read	Digital audio extraction (minimum) -1,200 KB/s CD read - up to 7,200 KB/s	
	Media and Formats - Read	**Formats:** CD-DA, CD-ROM (Mode 1 and 2), CD-XA Ready, Photo CD (Single and Multi-session), Mixed Mode (Audio and Data combined), CD-I (FMV), CD Plus, CD-Extra; **Media:** stamped, CD-R, CD-RW	
	Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 0 (16.7 MB/s); UltraDMA Mode 2 (33.3 MB/s)	
	Access Times (typical)	**Random**	< 100 ms @ 48x
		Full-Stroke	< 150 ms
	Start-up Time (typical)	< 7 s (single session)	< 30 s (multisession)
	Stop Time (typical)	< 4 s	
	Read Buffer Size	128 KB (minimum)	
	Audio Output	**Line-Out**	0.7 VRMS
		Signal-to-Noise Ratio	80 dB
		Channel Separation	65 dB
	Configuration Jumper Block	Master, slave, and cable select modes	
	Operating Conditions	**Temperature**	41° to 122° F (5° to 50° C)
		Humidity	10% to 80%
	Approvals/ Environmental	UL 1950 (US and Canada), CSA, SEMKO, TUV; CE, FDA, FCC, IC, C-TICK	
	Operating Systems Supported	Microsoft Windows 2000 and Microsoft Windows XP Pro.	
	Supplied Software	None	

48/24/48X CD-RW	**Capacity**	700 MB CD disc
	Dimensions (HxWxD)	1.63 x 5.75 x 7.27 in (4.13 x 14.6 x 18.5 cm)
	Weight	2.0 lb (0.9 kg)
	Interface	ATAPI/EIDE
	Mounting Orientation	Horizontal or vertical
	Data Transfer Rates – Read	Digital audio extraction (minimum) —1,800 KB/s (12X) CD read — up to 7,200 KB/s (48X) DVD read — up to 21,600 KB/s (16X)

Media and Formats - Read	**Formats**: CD-DA, CD-ROM (Mode 1 and 2), CD-ROM XA (Mode 2, Form 1 and 2), Mixed Mode, CD-Plus, CD-Extra, CD-I FMV, Video CD, CD-Text, Photo CD (single and multisession); **Media**: stamped, CD-R, CD-RW		
Data Transfer Rates - Write	CD-R write — 1200 KB/s (8X) CD-R write — 1800 KB/s (12X) CD-R write — 2400 KB/s (16X) CD-R write — 3000 KB/s (20X) to 6000 KB/s (40X) CD-R write — 7200 KB/s (48X) CD-RW write — 600 KB/s (4X) CD-RW write —1500 KB/s (10X) CD-RW write — 2400 KB/s (16X) CD-RW write —3600 KB/s (24X)		
Media and Formats - Write	**Formats**: CD-DA, CD-ROM (Mode 1 and 2), CD-ROM XA (Mode 2, Form 1 and 2), Mixed Mode, CD-Plus, CD-Extra, CD-I FMV, Video CD, CD-Text; **Media**: CD-R, CD-RW (including ultra-speed)		
Write Methods	Disc-at-once, session-at-once,, track-at-once, incremental fixed and variable packet, multisession		
Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 2 (33.3 MB/s)		
Access Times (typical reads, including settling)	CD-ROM Mode 1	100 ms	
	Full Stroke CD	160 ms (seek)	
Start-up Time (typical)	<4 s (single session), <30 s (multisession)		
Stop Time (typical)	<3 s		
Write Buffer Size	2 MB		
Audio Output	Line-Out	0.7 VRMS	
	Signal-to-Noise Ratio	80 dB	
	Channel Separation	70 dB	
Configuration Jumper Block	Master, slave, and cable select modes		
Operating Conditions	**Temperature**	41° to 113° F (5° to 45° C)	
	Humidity	10% to 80%	
Approvals/ Environmental	MPC-3 compliant, multi-read requirements, UL 1950, ACA AS/NZS 3548, ANSI C63.4–1992, ATAPI Spec SFF-8020, ATA Spec X3T9.2, CB Bulletin No. 92A, CSA C22.2 No. 950-1995, C.I.S.P.R. Pub 22, DHHS/FDA, EMKO-TSE 07/94, TUV, EN60825-1		
Operating Systems Supported	Microsoft Windows 2000, Windows XP		
Supplied software	Roxio Easy CD Creator 5.3.4: Create or copy CDs and DVDs, including music and data CDs, and data DVDs; Dantz Retrospect Express 6.0: Back up systems to CD, DVD, or tape media.		

16X/40 DVD-ROM Read	**Height**	5.25-inch, half-height

Technical Specifications

Interface type	ATAPI	
Dimensions–External, Excluding Bezel (W x H)	5.88 x 1.71 in (14.9 x 4.34 cm)	
Disc diameter	5 in, 3 in (12 cm, 8 cm)	
Disc thickness	0.05 inch (1.2 mm)	
Track pitch	1.6 µm (CD), 0.74 µm (DVD)	
Disc center hole diameter	0.6 inch (15 mm)	
Disc formats	DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R/RW multi-border; DVD+RW; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW	
Disc capacity	**DVD-ROM**	4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+ RW)
	CD-ROM	540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm)
Block size (bytes)	DVD-ROM – 2048; CD-ROM Mode 0 – 2352; CD-ROM Mode 1 – 2352, 2340, 2336, 2048; CD-ROM Mode 2 – 2352, 2340, 2336, 2048	
Access times (typical reads, including settling)	**DVD-ROM single layer**	< 120 ms
	CD-ROM Mode 1	< 90 ms
	Full stroke DVD	< 240 ms (seek)
	Full stroke CD	< 160 ms (seek)
Data transfer rates	2600 – 6000 KB/s (40X CAV CD-ROM mode) 8100 – 21,600 KB/s (16X CAV DVD-ROM mode)	
Data transfer modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s)	
Power	Source	Four-pin, DC power receptacle
	DC power requirement	5 VDC ± 5%—100 mV ripple p-p 12 VDC ± 5%—200 mV ripple p-p
	DC current	5 VDC - <800 mA typical, < 1000 mA maximum 12 VDC - < 870 mA typical
Audio Output Level	0.7 Vrms (typical)	
Configuration Jumper Block	Master, slave, and cable select modes	
Data interface connector	40-pin, shrouded and keyed, flat ribbon	
Environmental (all conditions non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)
	Relative humidity (operating)	10% to 85%
	Maximum wet bulb temperature (operating)	86° F (30° C)

	Certifications, approvals	MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, SEMKO, NEMKO, DEMKO, FIMKO, EN 60825-1, UL 60950, CSA C22.2 60950-2000
	Operating systems supported	Microsoft Windows 2000, Windows XP Professional
48/24/48+16X Combo CD-RW/DVD-ROM	**Capacity**	4.7 and 9.4 GB DVD disc/700 MB CD disc
	Dimensions (HxWxD)	1.63 x 5.75 x 7.27 in (4.13 x 14.6 x 18.5 cm)
	Weight	2.0 lb (0.9 kg)
	Interface	ATAPI/EIDE
	Mounting Orientation	Horizontal or vertical
	Data Transfer Rates – Read	Digital audio extraction (minimum) —1,200 KB/s (8X) CD read — up to 7,200 KB/s (48X) DVD read — up to 21,600 KB/s (16X)
	Media and Formats - Read	**CD Formats**: CD-DA, CD-ROM (Modes 1 and 2), CD-ROM XA (Mode 2, Form 1 and 2), Mixed mode, CD-Extra, CD-I FMV, Video CD, Photo CD (single and multi-session), CD-Text, CD-Plus; CD Media: stamped, CD-R; CD-RW **DVD Formats**: DVD-ROM, DVD-Video (with application support), DVD-R (version 1.0 and 2.0), DVD-RW (version 1.0 and 1.1), DVD-R multi-border; **DVD Media**: stamped (single or dual layer, single sided), DVD+ RW, DVD+ R, DVD-R, DVD-RW
	Data Transfer Rates - Write	CD-R write — 600 KB/s (4X) CD-R write — 1200 KB/s (8X) CD-R write — 1800 KB/s (12X) CD-R write — 2400 KB/s (16X) CD-R write — 3600 KB/s (24X) CD-R write — 4800 KB/s (32X) CD-R write — 6000 KB/s (40X) CD-R write — 7200 KB/s (48X) CD-RW write — 600 KB/s (4X) CD-RW write —1500 KB/s (10X) CD-RW write — 2400 KB/s (16X) CD-RW write —3600 KB/s (24X)
	Media and Formats - Write	**CD Formats**: CD-DA, CD-ROM (Mode 1), CD-ROM XA (Mode 2, Form 1 and 2), Mixed mode, CD-Extra, CD-I FMV, Video CD, CD-Plus; **CD Media**: CD-R; CD-RW
	Write Methods	Disc-at-once, session-at-once,, track-at-once, incremental fixed and variable packet, multisession
	Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 2 (33.3 MB/s)
	Access Times (typical reads, including settling)	**DVD-ROM Single Layer Random** 120 ms **CD-ROM Mode 1** 110 ms **Full Stroke DVD** 210 ms

		Full Stroke CD	160 ms
	Start-up Time (typical)	<4 seconds (single session), <30 seconds (multisession)	
	Stop Time (typical)	4 s	
	Write Buffer Size	2 MB (minimum)	
	Audio Output	**Line-Out**	0.75 VRMS
		Signal-to-Noise Ratio	74 dB
		Channel Separation	65 dB
	Configuration Jumper Block	Master, slave, and cable select modes	
	Operating Conditions	**Temperature**	41° to 122° F (5° to 50° C)
		Humidity	10% to 85%
	Approvals/ Environmental	MPC-3 compliant, multi-read requirements, UL 1950, ACA AS/NZS 3548, ANSI C63.4–1992, ATAPI Spec SFF-8020, ATA Spec X3T9.2, CB Bulletin No. 92A, CSA C22.2 No. 950-1995, C.I.S.P.R. Pub 22, DHHS/FDA, EMKO-TSE 07/94, TUV, EN60825-1	
	Operating Systems Supported	Microsoft Windows 2000, Windows XP	
HP 400i DVD+RW (8X/4X/12X/24X/10X/40X (DVD+R/+RW)	**Capacity**	4.7 GB 5.25-inch	
	Orientation	Either horizontal or vertical	
	Interface Type	ATAPI	
	Dimensions (W x H x D)	8.0 x 5.9 x 1.7 in (20.3 x 15.0 x 4.4 cm) half-height, tray-load	
	Track Pitch	1.6 um (CD), 0.74 um (DVD)	
	Reference Scanning Velocity	1.2 m/s (CD); 3.49 m/s (DVD SL); 3.84 m/s (DVD DL)	
	Recording Method	Disc-at-once, Track-at-once, and Session-at-once; Variable Packet and Fixed Packet	
	Write Support	DVD+R, DVD+RW, CD-R, CD-RW	
	Read Support	DVD-ROM (single- and dual-layer), DVD+R, DVD+RW, DVD-R, DVD-RW, CD-ROM Mode 1, CD-ROM XA (Mode 2, forms 1 and 2), CD TEXT, Photo CD single- and multi-session), CD-DA (Audio CD), CD-Extra, CD-R, CD-RW (supports AM2)	
	Write Speed	**DVD+R**	8X CLV (10800 KB/s)
		DVD+RW	4X CLV (5400 KB/s)
		CD-R	24X CLV (3600 KB/s)
		CD-RW	10X CLV (1500 KB/s)
	Read Speed	**DVD-ROM**	12X CAV (6750 - 16200 KB/s)
		DVD+R, DVD+RW, DVD-R, DVD-RW	8X CAV (5400 - 10800 KB/s)
		CD-ROM, CD-R, CD-RW, CD-Audio	40X CAV (2550 to 6000 KB/s)

Technical Specifications

	Date Buffer	**Read**	2 MB
		Write	2 MB
	Access Time (typical reads, including settling)	**Random DVD**	< 140 ms (typical)
		Random CD	< 125 ms (typical)
		Full Stroke DVD	< 250 ms (seek)
		Full Stroke CD	< 210 ms (seek)
	Operating Systems Support	Microsoft® Windows® XP Professional	
	Power Requirement	5 V, +12 V (1.6A, 1.4A)	
	Front Panel Features	Disc loading tray, forced eject hole read/write indicator, eject button	
	Rear Panel Features	ATAPI interface, digital audio output 1, analog audio output, device configuration jumper, DC input DC Power Connector, 4 pin; Line Out Connector, 4 pin; IDE Bus Connector, 40 pin; Configuration Jumper Pins; Label to identify each connect	
	Regulatory Approvals	UL, CSA, CB Report, FIMKO, SEMKO, FCC Class B, FDA, CE Marking, C-Tick, CISPR-229, Korean EMC, Taiwan EMC	
	Option Kit contents	DVD+R/+RW Drive, InterVideo WinDVD, InterVideo WinDVD Creator, Roxio Easy CD Creator, Dantz Retrospect Express Backup Software and DVD+R media.	
HP Drive Key (USB 2.0)	**Dimensions** (HxWxD)	0.9 x 0.7 x 3.9 in (2.3 x 1.8 x 9.8 cm)	
	Storage Capacity	128 MB or 256 MB	
	Weight	0.05 lb (0.02 kg)	
	Transfer Rates	Read-1023 KB/Sec; Write-850 KB/Sec	
	Operating Temperature	32° to 113° F (0° to 45° C)	
	Non-operating Temperature	4° to 140° F (-20° to 60° C)	
	Operating System Support	Microsoft Windows 2000, Windows XP Professional. No driver is required for this device. Native support is provided by the operating system.	
	Option Kit Contents	HP Drive Key, documentation	

Technical Specifications

Intel Pro/1000 XT Server Adapter Gigabit PCI card	**Network Interface**	10Base-T, 100Base-TX, 1000Base-T	
	Expansion Bus Architecture	PCI 2.2, PCI-X 1.0	
	Network Transfer Rate	10Base-T (Half-Duplex)	10-Mb/s
		10Base-T (Full-Duplex)	20-Mb/s
		100Base-TX (Half-Duplex)	100-Mb/s
		100Base-TX (Full-Duplex)	200-Mb/s
		1000Base-TX (Half-Duplex)	1000-Mb/s
	Connectors	RJ-45	
	Standards Compliance	10-Mb/s Ethernet	IEEE 802.3
		100-Mb/s Ethernet	IEEE 802.3µ
		1000-Mb/s Ethernet	IEEE 80
	I/O Address	Auto-configured	
	Remote Wakeup	Yes	
	Management capabilities	Wired for management (WfM) Baseline v2.0; DMI 2.0 support, WMI and SNMP-manageable; Offline diagnostics; ACPI Power Management; WoL	
	Operating Temperature	0° to 55° F (10° to 35° C)	
	Operating Humidity (non-condensing)	85% at 131° F (55° C)	
	Operating Altitude	10,000 ft (3,048 m)	
	Communication Processor	Intel 82559	
	Memory	64KB integrated	

Intel Pro 1000 MT NIC DC193A	**Dimensions**	6.4 x 4.8 x 0.8 in (16.3 x 12.1 x 1.9 cm)
	Connector	RJ-45
	Controller	Intel 82540EM Gigabit Controller
	Memory	Integrated 96 Kb frame buffer memory
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.1A, 802.1P, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI 2.2
	Data path width	32-bit, 33/66 MHz bus interface
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	1.48 watts @ +3.3V AUX supply with 5V tolerance
	Boot ROM support	Yes

Technical Specifications

	Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T, 1000 Mbps
	Environmental	**Operating temperature** 32° to 131°F (0° to 55° C) **Operating humidity** 85% at 131° F (55° C)
	Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Intel PROset II utility
	Kit contents	The Intel Pro 1000 MT NIC, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement
NVIDIA Quadro NVS 280 Graphics Card	**2D controller**	Integrated Quadro 280 2-D graphics processor unit (GPU)
	VGA controller	Integrated into the Quadro GPU
	Bus type	AGP 8X
	RAMDAC	Dual 350 MHz
	Memory speed and type	200 MHz 8M x16 DDR
	Memory amount	64 MB
	Texture Memory	Unified with frame buffer
	Form Factor	ATX
	Controller clock speed	275 MHz
	Color planes	32-bit color buffer
	Overlay planes	1 16-bit Video overlay plane
	Maximum vertical refresh rate	120 Hz
	Maximum pixel clock	350 MHz
	Dual Screen support	Yes
	Single DVI Support	Yes
	Dual DVI Support	Yes
	Operating systems	Microsoft Windows 2000: Full native Dual View mode, Span or Big Desktop mode, and Clone mode Microsoft Windows XP: Full native Dual View mode, Span or Big Desktop mode, and Clone mode
	Available graphics drivers	See: http://www.hp.com/support/workstation_drivers/
	Physical dimensions	2.586 x 6.6 in (6.57 x 16.76 cm)
	High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling

Technical Specifications

NVIDIA Quadro NVS 280 Graphics Card display resolutions & refresh rates

Analog Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	240 Hz
800 x 600	16.7 M	240 Hz
1024 x 768	16.7 M	200 Hz
1152 x 864	16.7 M	170 Hz
1280 x 1024	16.7 M	150 Hz
1600 x 1200	16.7 M	100 Hz
1920 x 1080	16.7 M	85 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1440	16.7 M	75 Hz
2048 x 1536	16.7 M	60 Hz
Digital Resolution Maximum	**Colors Supported Maximum**	**Refresh Rate**
640 x 480	16.7 M	75 Hz
800 x 600	16.7 M	75 Hz
1024 x 768	16.7 M	75 Hz
1152 x 864	16.7 M	60 Hz
1280 x 1024	16.7 M	60 Hz
1600 x 1200	16.7 M	60 Hz (primary only)

NVIDIA Quadro NVS 400 Graphics Card

Form Factor	ATX
Graphics Controller	Integrated Quadro4 2D/3D 128-bit graphics processor unit (GPU)
Bus Type	PCI
RAMDAC	Dual 350 MHz
Memory	64 MB 220 MHz, 4mx 32 DDR per GPU, 32 MB per GPU unified frame buffer
Connectors	Dual LFH-60
Dimensions	Low-profile form factor
Multi-monitor support	1 to 4 displays with nView – with two cards (1 PCI per card), up to 8 monitors can be driven
nView Hardware Architecture	32-bit color 2048x1536 @ 75Hz maximum resolution Dual 350MHz RAMDACs Integrated TMDS Digital Vibrance Control (DVC) High-performance 2D rendering engine Optimized for 32-, 24-, 16-, 15- and 8-bpp modes
High-definition video processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT Motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
Supported graphics APIs	Fully compliant with OpenGL 1.3 and DirectX 8.1
Available graphics drivers	Microsoft Windows XP and Microsoft Windows 2000, Linux See: http://www.hp.com/support/workstation_drivers/

Technical Specifications

NVIDIA Quadro NVS 400 Graphics Card display resolutions & refresh rates

	Single CRT display	
Resolution	**Maximum Refresh Rate**	**Bits per Pixel**
640 x 480	120 Hz	8, 16, 24
800 x 600	120 Hz	8, 16, 24
1024 x 768	120 Hz	8, 16, 24
1152 x 864	120 Hz	8, 16, 24
1280 x 1024	120 Hz	8, 16, 24
1600 x 1200	100 Hz	8, 16
1600 x 1200	85 Hz	8, 16, 24
1920 x 1080	100 Hz	8, 16
1920 x 1080	75 Hz	8, 16, 24
1920 x 1200	85 Hz	8, 16
1920 x 1200	70 Hz	8, 16, 24
1920 x 1440	75 Hz	8, 16
1920 x 1440	60 Hz	8, 16, 24
2048 x 1536	60 Hz	8, 16

NVIDIA Quadro4 380 XGL Graphics Card	**Form Factor**	ATX
	Graphics Controller	NVIDIA NV18GL GPU
	Bus Type	AGP 8x Version 3.0 compliant AGP 4x/2x Version 2.0 compliant
	RAMDAC	Dual 350MHz integrated
	Memory	64MB DDR SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	VGA DB-15 and DVI-I analog/digital monitor outputs, 4-pin mini DIN providing TV output
	Dimensions	AGP full height ATX card. 4.25 x 6.875 in (10.795 x 17.463 cm)
	Multi-monitor support	Dual monitor
	Additional product features	64 MB DDR SDRAM unified frame buffer, Z-buffer and Texture storage 128 KB BIOS 3.3V Flash ROM reprogrammable by SW Hardware Overlay Planes Hardware two-sided lighting Hardware accelerated antialiased points and lines TV Output Diamond exit rule line rasterization for improved line quality 3D Texture support Occlusion Culling Compliant with Microsoft/Intel PC2001 Workstation requirements Video Timings compliant with VESA DMT 1.0 and VESA GTF 1.0 specifications DDC2B+ Monitor support for Windows 2000 and Windows XP ACPI Version 1.0b Power Management support (all modes)
	AGP 8x Version 3.0 compliant and 2x/4x Version 2.0 compliant including	Sideband Addressing AGP Texturing (Execute Mode) Fast writes support

Technical Specifications

NV18GL GPU featuring:	275 MHz engine clock rate 250 MHz memory clock rate 128-bit memory interface VGA controller Dual integrated display controllers supporting up to 1920x1440 @ 85Hz and 2048x1536 @ 75Hz on both displays 4 parallel pixel pipelines 2 parallel geometry engines nfiniteFX II programmable Vertex and Pixel Shader technology and NVIDIA OpenGL extensions Full hardware support for NVIDIA Cg shader programming language
Supported graphics APIs	OpenGL 1.3 (and OpenGL 2.0 when available) ICD with immediate mode support for all OGL primitive types DirectX 8 and above
Available graphics drivers	HP-tested Windows 2000, HP-tested Windows XP, HP-tested Linux (1st Calendar Quarter 2003) HP qualified drivers may be preloaded or available from the HP support Web site: http://www.hp.com/support/workstation_drivers/

NVIDIA Quadro4 380 XGL Graphics Card display resolutions & refresh rates

	Monitor 1, 2 Analog/Digital	
Resolution	**Maximum Refresh Rate**	**Bits per Pixel**
640x480	240Hz/240Hz	8, 16, 24
800x600	240Hz/200Hz	8, 16, 24
1024x768	170Hz/140Hz	8, 16, 24
1152x864	170Hz/100Hz	8, 16, 24
1280x720	150Hz/120Hz	8, 16, 24
1280x960	150Hz/85Hz	8, 16, 24
1280x1024	150Hz/75Hz	8, 16, 24
1600x900	120Hz/75Hz/ No Digital Display Support (unbold)	8, 16, 24
1600x1024	100Hz/72Hz/ No Digital Display Support	8, 16, 24
1600x1200	120Hz/60Hz/ No Digital Display Support	8, 16
1600x1200	100Hz/60Hz/ No Digital Display Support	24
1920x1080	100Hz/ No Digital Display Support	8, 16
1920x1080	85Hz/ No Digital Display Support	24
1920x1200	100Hz/ No Digital Display Support	8, 16
1920x1200	85Hz/ No Digital Display Support	24
1920x1440	85Hz/ No Digital Display Support	8, 16

	1920x1440	75Hz/ No Digital Display Support	24
	2048x1536	75Hz/ No Digital Display Support	8, 16
	2048x1536	60Hz/ No Digital Display Support	24

ATI FireGL T2-128 Graphics Card	**Form Factor**	ATX
	Graphics Controller	ATI FGL 9600 VPU
	Bus Type	AGP-8x/4x compliant
	DAC	Dual 400MHz/16-bit
	Memory	128 MB DDR SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	DVI-I and VGA monitor outputs
	Dimensions	Single AGP/ATX card. 230.28mm x 107.96mm
	Multi-monitor support	DVI-I and VGA connectors support dual display, maximum resolution of 2048x1536 analog, 1600x1200 digital
	Additional product features	128 MB DDR SDRAM unified frame buffer, Z-buffer and Texture storage 64-KB BIOS Serial Flash ROM, reprogrammable by SW, 3.3V only, no Jumpers 2D and 3D acceleration provided for 16-bit and 32-bit RGB? modes Hardware cursor with full color alpha channel 32-bit (24+8-bit stencil) Z buffer Bus mastering support for 2D/3D display lists and local memory vertex list execution Hardware lighting support for 8 light sources Bilinear, Trilinear and Anisotropic texturing Cubic Environment and Perturbation Bump Mapping Projective Texture, 3D Texture and Video Texture support Full Scene Anti-Aliasing (FSAA) support with up to 6 subsamples Video Engine supports YCrCb (4:2:2, 4:1:0, 4:2:0) to RGB conversion Video scaling and up to 4x4 tap filtering supported for all YUV and RGB16/32 formats Per pixel quad buffering on all screen resolutions VESA compliant Stereoscopic Interface on MiniDin Connector Compliant with Microsoft/Intel PC2001 Workstation requirements Video Timings compliant with VESA DMT 1.0 and VESA GTF 1.0 specifications DDC2B+ Monitor support on all OS platforms ACPI Version 1.0b Power Management support (all modes)
	AGP4x/8x Version 3.0 compliant including	Sideband Addressing AGP Texturing (Execute Mode) AGP Read and AGP Write Support 8X Fast write support
	FGL 9600 GPU featuring	VGA controller supporting full standard feature set

	2D Engine with 128-bit datapath processing multiple pixels per clock PIXEL TAPESTRY III, 3D rendering engine utilizing 2 parallel pipelines with two texture blending units each capable, of handling up to 8 texels in a single pass, delivering 2.4 Gigatexels/s fill rate CHARISMA ENGINE III, geometry unit utilizing 4 vertex processing engines, capable of executing two instructions per clock cycle each, thus yielding up to 200 million transformed, clipped and lit triangles per second. VIDEO IMMERSION III, industry leading video technology supporting MPEG 2 encode/decode Dual independent display controllers with 4K x 4K address space each 128-bit external frame buffer interface
Supported graphics APIs	OpenGL 1.3 ICD with immediate mode support for all OGL primitive types DirectX 9.0
Processor requirements	Intel Pentium 4, or Xeon processor
Available graphics drivers	Windows 2000 with SP1 (or higher) Windows XP Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://www.hp.com/support/workstation_drivers/

ATI FireGL T2-128 Graphics Card display resolutions & refresh rates

Analog and Digital Display with 15-pin VGA Connector

Resolution	Maximum Refresh Rate	Bits per Pixel
640x480	100Hz	16, 32
800x600	100Hz	16, 32
1024x768	100Hz	16, 32
1152x864	100Hz	16, 32
1280x960	100Hz	16, 32
1280x1024	100Hz	16, 32
1600x1000	100Hz	16, 32
1600x1024	85Hz	16, 32
1600x1200	85Hz	16, 32
1792x1344	75Hz	16, 32
1920x1080	75Hz	16, 32
1920x1200	75Hz	16, 32
2048x1536	60Hz	16, 32

Digital Monitor with DVI Connector

Resolution	Maximum Refresh Rate	Bits per Pixel
640x480	75Hz	16, 32
800x600	75Hz	16, 32
1024x768	75Hz	16, 32
1152x864	75Hz	16, 32
1280x1024	75Hz	16, 32
1600x1000	60Hz	16, 32
1600x1024	60Hz	16, 32

1600x1200	60Hz	16, 32

NVIDIA Quadro FX1100 Graphics Card	**Form Factor**	ATX
	Graphics Controller	NVIDIA NV36GL GPU
	Bus Type	AGP 8X Version 3.0 compliant
	RAMDAC	Dual 400 MHz integrated
	Memory	128 MB 650MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	2 DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output
	Multi-monitor support	Dual integrated analog display controllers supporting up to 2048 x1536 @ 85Hz on both displays Dual external digital display controllers supporting up to 1600 x 1200 @ 60Hz on both displays
	Additional product features	128 MB DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage 128 KB BIOS 3.3V Flash ROM reprogrammable by SW Hardware Overlay Planes Hardware two-sided lighting Hardware accelerated antialiased points and lines Quad-buffered Stereo Diamond exit rule line rasterization for improved line quality 3D Texture support Occlusion Culling Compliant with Microsoft®/Intel® PC2001 Workstation requirements Video Timings compliant with VESA DMT 1.0 and VESA GTF 1.0 specifications DDC2B+ Monitor support on all OS platforms ACPI Version 1.0b Power Management support (all modes)
	AGP1x/2x/4x/8x Version 3.0 compliant including	Sideband Addressing AGP Texturing (Execute Mode) Fast writes support
	NV35GL GPU featuring	425 MHz engine clock rate 325 MHz memory clock rate 128-bit memory interface VGA controller 128-bit precision throughout the graphics pipeline 12 bit sub-pixel precision nfiniteFX II programmable vertex and pixel shader technology
	Supported graphics APIs	OpenGL 2.0 ICD with immediate mode support for all OGL primitive types DirectX 8,9
	Available graphics drivers	Microsoft: Windows® XP, Windows 2000 HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html

Technical Specifications

NVIDIA Quadro FX 1100 Graphics Card display resolutions & refresh rates

	Monitor 1, 2 Analog/Digital	
Resolution	**Maximum Refresh Rate**	**Bits per Pixel**
640x480	240Hz/240Hz	8, 16, 32
800x600	240Hz/200Hz	8, 16, 32
1024x768	200Hz/140Hz	8, 16, 32
1152x864	170Hz/100Hz	8, 16, 32
1280x720	150Hz/120Hz	8, 16, 32
1280x960	150Hz/85Hz	8, 16, 32
1280x1024	150Hz/85Hz	8, 16, 32
1600x900	120Hz/75Hz	8, 16, 32
1600x1024	100Hz/72Hz	8, 16, 32
1600x1200	120Hz/60Hz	8, 16
1600x1200	100Hz/60Hz	32
1920x1080	100Hz/na	8, 16
1920x1080	85Hz/na	32
1920x1200	100Hz/na	8, 16
1920x1200	85Hz/na	32
1920x1440	85Hz/na	8,16, 32
2048x1536	85Hz/na	8, 16, 32

NVIDIA Quadro FX3000 Graphics Card

Form Factor	ATX
Graphics Controller	NVIDIA NV35GL GPU
Bus Type	AGP 8X Version 3.0 compliant
RAMDAC	Dual 400MHz integrated
Memory	256 MB DDR SDRAM unified frame buffer, Z-buffer and Texture storage
Connectors	2 DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output
Dimensions	AGP full height ATX card. 4.25 x 6.875 in (10.795 x 17.463 cm)
Multi-monitor support	Dual integrated display controllers supporting up to 2048x1536 @ 85Hz on both displays
Additional product features	256 MB DDR SDRAM unified frame buffer, Z-buffer and Texture storage 128 KB BIOS 3.3V Flash ROM reprogrammable by SW Hardware Overlay Planes Hardware two-sided lighting Hardware accelerated antialiased points and lines Quad-buffered Stereo Diamond exit rule line rasterization for improved line quality 3D Texture support 12-bit subpixel precision 128-bit precision graphics pipeline Occlusion Culling Dual Link DVI on one output enabling driving digital displays up to 2048x1536 Compliant with Microsoft/Intel PC2001 Workstation requirements Video Timings compliant with VESA DMT 1.0 and VESA GTF 1.0 specifications

	DDC2B+ Monitor support on all OS platforms ACPI Version 1.0b Power Management support (all modes)
AGP8xVersion 3.0 compliant including	Sideband Addressing AGP Texturing (Execute Mode) Fast write support
NV35GL GPU featuring	400 MHz engine clock rate 425 MHz memory clock rate 250-bit memory interface VGA controller 8 parallel pixel pipelines 3 parallel geometry engines nfiniteFX II programmable dual Vertex Shader and Pixel Shader technology
Supported graphics APIs	OpenGL 1.5 ICD with immediate mode support for all OGL primitive types DirectX 9
Available graphics drivers	Windows 2000 Windows XP HP-tested Linux HP qualified drivers may be preloaded or available from the HP support Web site: See: http://www.hp.com/support/workstation_drivers/

NVIDIA Quadro FX3000 Graphics Card display resolutions & refresh rates

MONITOR 1, 2 ANALOG/DIGITAL		
Resolution	**Maximum refresh rate**	**Bits per pixel**
640x480	240Hz/240Hz	8, 16, 32
800x600	240Hz/200Hz	8, 16, 32
1024x768	200Hz/140Hz	8, 16, 32
1152x864	170Hz/100Hz	8, 16, 32
1280x720	150Hz/120Hz	8, 16, 32
1280x960	150Hz/85Hz	8, 16, 32
1280x1024	150Hz/85Hz	8, 16, 32
1600x900	120Hz/75Hz	8, 16, 32
1600x1024	100Hz/72Hz	8, 16, 32
1600x1200	120Hz/60Hz	8, 16
1600x1200	100Hz/60Hz	32
1920x1080	100Hz/60Hz in Dual Link Mode	8, 16
1920x1080	85Hz/60Hz in Dual Link Mode	32
1920x1200	100Hz/60Hz in Dual Link Mode	8, 16
1920x1200	85Hz/60Hz in Dual Link Mode	32
1920x1440	85Hz/60Hz in Dual Link Mode	8, 16, 32
2048x1536	85Hz/60Hz in Dual Link Mode	8, 16, 32
3840x1200	21Hz/24Hz	8, 16, 32
3840x2400	13Hz	8, 16, 32

Technical Specifications

IT & Broadcast Rack Kit	**Dimensions** (H x W)	7.75 (5U) x 19 in (22.23 x 48.26 cm)
	Rack Mounting Depth	Adjustable: Minimum Mounting Depth: 19 inch (48.26 cm) Maximum Mounting Depth: 31 inch (79.65 cm)
	Weight Capacity	300 lb (136 kg)
	Material	Steel (graphite color)
	Rack Mounting kit	Left and right flanges with handles Four M4 flathead screws Left and right rails Two glide strips Top trim strip 3 mounting hardware kits (M6 for Compaq Racks, M5 for HP Series-E racks, rail adapters and 10-32 hardware for racks with pre-threaded columns)

Sound Blaster Audigy 2 ZS PCI card	**Audio Quality**		Sound Blaster 24-bit ADVANCED HD Quality
	Signal to Noise Ratio (SNR)		108dB
	Max. Audio Resolution Playback		24-bit/192kHz in Stereo 24-bit/96kHz in 5.1 DVD-Audio Quality
	Max. Recording/ Sampling Rate		24-bit/96kHz
	DACs		24-bit/192kHz
	Max. No. of 3D Voices		64
	Max. Channels in 3D Positional Audio		7.1
	EAX® and EAX® ADVANCED HD™		Yes including Hardware Acceleration of EAX and/or EAX ADVANCED HD
	Connectors		PCI 2.1 or higher compliant slot Analog Speakers Support for Headphone, 2.1, 4.1, 5.1, 6.1, 7.1 Digital Speakers Support for Headphone, 2.1, 4.1, 5.1 and 24-bit/96kHz speakers One High Speed FireWire® port
	Additional product features	**Music Playback/ Music Creation**	Integrated Digital Music Player Integrated Digital Music Ripping (in Player) - MP3 & WMA True Bit Accurate Recording w/o SRC Advanced Resolution DVD-Audio Playback EAX® Music Enhancements EAX Effects CMSS 3D Up mixing of Stereo to Multi-Channels Audio Clean-up

		Smart Volume Management (SVM)
		Karaoke
		Multi-Channel Graphic Equalizer
		Bass Boost
		Virtual Surround over 2 Channel or Headphones
		Full Support for Windows® Media 9 24-bit/96kHz 5.1 content
		ASIO Low Latency Multi-Track Recording Support (16-bit/48kHz)
		ASIO 2.0 Direct Monitoring
	Movies	THX Certification
		THX Setup Console
		Dolby Digital 5.1 Playback
		Dolby Digital EX 6.1 Playback
		DTS-ES 6.1 Playback
	Gaming	EAX
		EAX ADVANCED HD
		Hardware Acceleration of EAX &/or EAX ADVANCED HD
		Up to 64 3D Voices
		7.1 Max. Channels in 3D Positional Audio
		Speaker Calibration for Optimal 3D Positional Audio

HP L1925 19-inch TFT Flat Panel Panel Monitor	**Type**	Thin film transistor (TFT)
	Viewable Image Area (diagonal)	19 in (48.25 cm) maximum viewable
	Screen Opening (WxH)	14.9 x 11.9 in (37.8 x 30.3 cm)
	Viewing Angle (typical)	170 degrees horizontal/170 degrees vertical (10:1 minimum contrast ratio)
	Brightness (typical)	Up to 250 nits (cd/m^2)
	Contrast Ratio (typical)	Up to 500:1 (typical)
	Response Rate (typical)	<20 ms (typical rise + fall)
	Pixel Pitch	0.294 mm
	Color Depth Support	16.7 million colors
Video Input	**Plug and Play**	Yes (supports VESA DDC2B; PC2001 compliant)
	Input Signal	Two connectors: one 15-pin mini D-sub analog VGA; and one DVI-I (VGA analog or digital)
	Input Impedance	75 ohms ± 2%
	Sync Input	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green

	Video Cable	VGA and DVI-D
	Video Cable Length	78 in (2.0 m)
Signal Interface/ Performance	**Horizontal Frequency**	30 to 82 kHz
	Vertical Frequency	56 to 75 Hz
	Graphics Controller	Pixelworks 131
	Native Resolution	1280x1024@75Hz analog 1280x 1024@60Hz digital
	Maximum Resolution (Analog)	1280x1024@75Hz analog
	Maximum Resolution (Digital)	1280x1024@75Hz analog
On Screen Display (OSD) **Controls**	**Preset VESA Graphic Modes** (non-interlaced)	640 x 480 @ 60 Hz, 72 Hz, 75 Hz 800 x 600 @ 60 Hz, 72 Hz, 75 Hz 1024 x 768 @ 60 Hz, 75 Hz 1280 x 1024 @ 60 Hz, 75 Hz
	Preset MAC Mode	832 x 624 @ 75 Hz 1152 x 870 @75 Hz
	Preset VGA Mode	640 x 480 @ 60 Hz, 72 Hz
	Preset SUN Mode	1152x900@66Hz
	Fail Safe Mode	Yes (limits out of range signal messages)
	Maximum Pixel Clock Speed	140 MHz
	User Programmable Modes	Yes, 10
	Anti-Glare	Yes
	Anti-Static	Yes
	AssetControl	Yes (accessible on HP/Compaq desktops featuring Intelligent Manageability)
	Default Color Temperature	Yes (6500k, 9300k, Custom User)
	Buttons or Switches	Power on/off; 4-button OSD; second level OSD buttons include auto adjust and dual-input switch
	Languages	English, Spanish, French, German, Dutch, Italian
	User Controls	Size and Positioning Contrast Brightness Clock, Clock Phase Selectable Color Temperature Input Selection Factory Reset Individual Color Contrast Full-screen Resolution
Power	**Power Supply**	Auto-ranging, 90 to 265 VAC; internal power

		supply, 47.5-63 Hz	
	Input Power	100 ~ 240 VAC	
	Nominal Current	1.5 A maximum	
	Frequency	50 ~ 60 Hz	
	Average	33 watts when displaying standard office software	
	Maximum	< 40 watts	
	Power Saving	< 2 watts	
	Off Mode	< 1 watts (switch off)	
	Power Cable Length	70 in (1.8 m); non-captive	
Mechanical	**Dimensions** (H x W x D)	**Unpacked w/ stand minimum height**	14.8 x 16.4 x 8.2 in (39.8 x 41.6 x 20.8 cm)
		Unpacked w/ stand maximum height	20 x 16.4 x 8.2 in (50.8 x 41.6 x 20.8 cm)
		Base Area (Footprint d x w)	8.2 x 12.2 in (20.8 x 30.9 cm)
		Panel only (w/o stand) (h x w x d)	13.5 x 16.4 x 2.6 in (34.2 x 41.6 x 6.6 cm)
		Packaged	26.0 x 26.0 x 26.0 in (66.0 x 66.0 x 66.0 cm)
	Weight	**Unpacked w/ stand**	17.6 lb (8 kg)
		Unpacked w/o stand	12 lb (5.5 kg)
		Packaged	23.5 l (10.7 kg)
	Tilt Range	-5° to +20°	
	Swivel Range	± 45° horizontal swivel	
	Height Adjustable	Yes (4.3 in/110 mm adjustment range)	
	Pivot Rotation	Yes, 90 °	
	Base	Ships attached and is removable after installation	
Environmental	**Temperature – Operating**	41° to 95° F (5° to 35° C)	
	Temperature – Non-operating	-4° to 140° F (-20° to 60° C)	
	Humidity – Operating	20% to 80%	
	Humidity – Non-operating	5% to 95%	
	Altitude – Operating	0 to 13,000 ft (0 to 4,000 m)	
	Altitude – Non-operating	0 to 40,000 ft (0 to 12,192 m)	
Options	**PC Comm Station**	Communication/audio hub that includes two stereo speakers (8 PMPO each), integrated microphone/dual function headset (phone and PC support), and USB port. Optional, part number 304251-008 (US) or P8814A (EMEA).	
Other	**Accessories Included**	VGA cable, DVI-D cable, user CD-ROM with Portrait software	

		User Guide Languages	English
		Warranty Languages	English
		Color	Carbon/Silver
		VESA Mounting	Yes (swing arm/ wall mount not included; base is shipped attached and must be removed for mounting options)
		VESA External Mounting	Yes (Standard 4 hole pattern, 100 mm)
		Kensington Lock-ready	Yes
	Certification and Compliance		Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, Energy Star Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Compliant (Pixel Defect Guidelines), Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Windows Certification.
	Compatibility		VESA Video Signal Standard (VSIS) Compliant video cards have been tested and proven compatible for use with the HP Flat Panel Monitor L1925. The HP L1925 has been tested for use with all HP workstations. **NOTE:** Features are subject to change without notice.
	Service and Warranty		Limited three-year parts and repair labor, service provider labor, and on-site service. Next Business Day advanced exchange direct replacement service available during warranty period. Certain restrictions and exclusions apply. For details, contact HP Customer Support at 970-635-1000 (USA) or 905-206-4663 (Canada).
HP L2035 20-inch TFT Flat Panel Monitor	**Panel**	**Type**	20-inch Active Matrix TFT (thin film transistor)
		Viewable Image Area (diagonal)	20.1 in (51 cm)
		Screen Opening (W x H)	16.2 x 12.17 in (41.1 x 30.9 cm)
		Viewing Angle (typical)*	Up to 170° H/170° V (10:1 minimum contrast ratio)
		Brightness (typical*	Up to 250 nits (cd/m^2)
		Contrast Ratio (typical)*	Up to 400:1
		Response Rate (typical)*	16 ms (typical, rise + fall)
		Pixel Pitch	0.255 mm
		Color Depth Support	16.7 million colors
			*All specifications are provided by the component manufacturers. Performance specifications represent the highest specification of all HP's component manufacturers' typical level specifications for performance. Actual performance may vary either higher or lower.
	On Screen Display	**Buttons or Switches**	PiP (Picture in Picture), Input select, auto adjust,

Technical Specifications

(OSD) **Controls**		OSD up, OSD down, OSD menu select, power
	Languages	English, French, German, Spanish, Italian
	User Controls	Brightness, contrast, positioning, color temperature, individual color control, serial number display, full screen resolutions, clock, clock phase, video picture-in-picture (size and position), input selection (includes separate direct access key for dedicated swap between inputs 1 and 2), factory reset
Signal Interface/ Performance	**Horizontal Frequency**	30 to 94 kHz (VGA input); 30 to 92 KHz (DVI input) (for modes with pixel clock less than 157 MHz)
	Vertical Frequency	48 to 85 Hz (VGA input); 30 to 92 KHz (DVI input) (for modes with pixel clock less than 157 MHz)
	Graphics Controller	Pixelworks PW171
	Native Resolution	1600 x 1200 @ 60 Hz (recommended)
	Preset VESA Graphic Modes (non-interlaced)	1600 x 1200 @ 60 Hz, 75 Hz (VGA input) 1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz 1280 x 960 @ 60 Hz 1152 x 900 @ 66 Hz 1024 x 768 @ 60 Hz, 75 Hz, 85 Hz 800 x 600 @ 60 Hz, 85 Hz 640 x 480 @ 60 Hz, 75 Hz, 85 Hz
	Text Mode	720 x 400 @ 70 Hz
	Mac Mode	1152 x 870 @ 75 Hz and 832 x 624 @ 75 Hz
	Sun Mode	1152 x 900 @ 66 Hz
	Maximum Pixel Clock Speed	202 MHz (VGA input); 162 MHz (DVI input)
	User Programmable Modes	Yes, 10
	Anti-Glare	Yes
	Anti-Static	Yes
	Default Color Temperature	6500 K
Video Input	**Plug and Play**	Yes
	Input Signal	Four connectors, including one 15-pin mini D-sub VGA, one DVI-I (VGA analog and digital input), one composite video, and one s-video
	Input Impedance	75 ohms ± 10%
	Sync Input	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green
	Video Cable	VGA to VGA; VGA to DVI-I; DVI-D to DVI-I
	Video Cable Length	5.9 ft (1.8 m)
Power	**Input Power**	Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC;

		internal power supply, 50 Hz/60 Hz	
	Frequency	47.5 to 63 Hz	
	Maximum	< 75 watts	
	Power Saving	< 5 watts	
	Power Cable Length	5.9 ft (1.8 m)	
Mechanical	**Dimensions** (H x W x D)	Unpacked w/stand	17.36 to 20.9 x 17.8 x 8.27 in (44.1 to 53.1 x 45.2 x 21.0 cm)
		Unpacked w/o stand (head only)	14.29 x 17.8 x 3.19 in (36.3 x 45.2 x 8.1 cm)
		Packaged	11.5 x 21.9 x 23.9 in (29.2 x 55.6 x 60.6 cm)
	Weight	Unpacked	With stand: 20.28 lb (9.2 kg); Without stand: 12.35 lb (5.6 kg)
		Packaged	26.9 lb (12.2 kg)
	Tilt Range	-5° to + 25° vertical	
	Swivel Range	-35° to + 35°	
	Height Adjustable	Yes, range 3.54 in (9.0 cm)	
	Pivot Rotation	Yes	
	Base	Attached	
Environmental	**Temperature – Operating**	46° to 95° F (10° to 35° C)	
	Temperature – Non-operating	6° to 140° F (-10° to 60° C)	
	Humidity – Operating	20% to 80% non-condensing	
	Humidity – Non-operating	5% to 85%	
	Altitude – Operating	+12,000 ft	
	Altitude – Non-operating	+40,000 ft	
Options	**HP Desktop Access Center**	Sold separately, the HP Desktop Access Center features integrated microphone/headset jacks, dual function headset for phone/PC support, a MultiBay slot for adding an optical drive (sold separately), and four USB ports for easy integration of third-party digital solutions; part number DK985A. For more information, refer to the HP Desktop Access Center QuickSpecs.	
Other	**Accessories Included**	VGA to VGA cable – connects the graphic card's VGA analog connector to the monitor's input #1 (VGA analog) connector VGA to DVI-I cable – connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector DVI-D to DVI-I cable – connects the graphic card's	

			DVI-D digital connector to the monitor's input #2 (DVI-I digital) connector
		User Guide Languages	English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish
		Warranty Languages	English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese
		Color	Carbonite/Silver
		VESA External Mounting	Yes (Standard 4 hole pattern, 100 mm)
		Kensington Lock-Ready	Yes
	Certification and Compliance	Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, Energy Star Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Windows Certification (Microsoft® Windows® 98, Microsoft Windows 2000, and Microsoft Windows XP)		
	Compatibility	Compatible with platforms using the VESA standard video modes and HP Compaq Business Desktops d500, d300, and d200 Series, Compaq Evo Desktops, and HP Business Desktops d300 series.	
	Service and Warranty	Limited three years parts, labor, and on-site service, including backlight. Availability varies by region. Certain restrictions and exclusions apply. Consult HP Customer Service for details.	
HP L2335 23-inch TFT Widescreen Flat Panel Display	**Panel**	**Type**	23-inch Active Matrix TFT (thin film transistor)
		Viewable Image Area (diagonal)	23 in (58.4 cm)
		Screen Opening (W x H)	19.53 x 12.24 in (49.6 x 31.1 cm)
		Viewing Angle (typical)*	Up to 170° H/170° V (10:1 minimum contrast ratio)
		Brightness (typical)*	Up to 250 nits (cd/m^2)
		Contrast Ratio (typical)*	Up to 350:1
		Response Rate (typical)*	25 ms (typical, rise + fall)
		Pixel Pitch	0.258 mm
		Color Depth Support	16.7 million colors

* All specifications are provided by the component manufacturers. Performance specifications represent the highest specification of all HP's component manufacturers' typical level specifications for performance. Actual performance may vary either higher or lower.

On Screen Display (OSD) **Controls**	**Buttons or Switches**	PiP (Picture in Picture), Input Select, Auto Adjust, OSD Up, OSD Down, OSD Menu Select, Power
	Languages	English, French, German, Spanish, Italian
	User Controls	Brightness, contrast, positioning, color temperature, individual color control, serial number display, full screen resolutions, clock, clock phase, video picture-in-picture (size and position), input selection (includes separate direct access key for dedicated swap between inputs 1 and 2), factory reset
Signal Interface/ Performance	**Horizontal Frequency**	30 to 94 kHz (VGA input); 30 to 92 KHz (DVI input) (for modes with pixel clock less than 157 MHz)
	Vertical Frequency	48 to 85 Hz (VGA and DVI input)
	Graphics Controller	Pixelworks PW172
	Native Resolution	1920 x 1200 @ 60 Hz (recommended)
	Preset VESA Graphic Modes (non-interlaced)	1920 x 1200 @ 60Hz 1600 x 1200 @ 60 Hz, 75 Hz 1280 x 1024 @ 60 Hz, 75Hz, 85 Hz 1280 x 960 @ 60 Hz 1152 x 900 @ 66 Hz 1024 x 768 @ 60 Hz, 75 Hz, 85 Hz 800 x 600 @ 60 Hz, 75Hz 640 x 480 @ 60 Hz, 75 Hz
	Text Mode	720 x 400 @ 70 Hz
	Mac Mode	1152 x 870 @ 75 Hz and 832 x 624 @ 75 Hz
	Sun Mode	1152 x 900 @ 66 Hz
	Maximum Pixel Clock Speed	202 MHz (VGA input); 162 MHz (DVI input)
	User Programmable Modes	Yes, 10
	Anti-Glare	Yes
	Anti-Static	Yes
	Default Color Temperature	6500 K
Video Input	**Plug and Play**	Yes
	Input Signal	Five connectors, including one 15-pin mini D-sub VGA, one DVI-I (VGA analog and digital input), one composite video, one s-video, component video
	Input Impedance	75 ohms ± 10%

	Sync Input	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green		
	Video Cable	VGA to VGA; VGA to DVI-I; DVI-D to DVI-I		
	Video Cable Length	5.9 ft (1.8 m)		
Power	**Input Power**	Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz		
	Frequency	47.5 to 63 Hz		
	Maximum	< 100 watts		
	Power Saving	< 5 watts		
	Power Cable Length	5.9 ft (1.8 m)		
Mechanical	**Dimensions** (H x W x D)	**Unpacked**	17.36 to 20.90 x 21.46 x 8.27 in (44.1 to 53.1 x 54.5 x 21.0 cm)	
		Unpacked w/o stand (head only)	14.57 x 21.46 x 3.35 in (37.0 x 54.5 x 8.5 cm)	
	Weight	**Unpacked**	22.27 lb (10.1 kg)	
		Packaged	30.87 lb (14.0 kg)	
	Tilt Range	-5° to + 25° vertical		
	Swivel Range	-35° to + 35°		
	Height Adjustable	Yes, range 3.54 in (9.0 cm)		
	Pivot Rotation	Yes		
	Base	Attached		
Environmental	**Temperature – Operating**	46° to 95° F (10° to 35° C)		
	Temperature – Non-operating	6° to 140° F (-10° to 60° C)		
	Humidity – Operating	20% to 80% non-condensing		
	Humidity – Non-operating	5% to 85%		
	Altitude – Operating	+12,000 ft		
	Altitude – Non-operating	+40,000 ft		
Options	**HP Desktop Access Center**	Sold separately, the HP Desktop Access Center Features integrated microphone/headset jacks, dual function headset for phone/PC support, a MultiBay slot for adding an optical drive (sold separately), and four USB ports for easy integration of third-party digital solutions; part number DK985A. For more information, refer to the HP Desktop Access Center QuickSpecs.		
Other	**Accessories Included**	VGA to VGA cable - connects the graphic card's VGA analog connector to the monitor's input #1		

		(VGA analog) connector VGA to DVI-I cable - connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector DVI-D to DVI-I cable - connects the graphic card's DVI-D digital connector to the monitor's input #2 (DVI-I digital) connector
	User Guide Languages	English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish
	Warranty Languages	English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese
	Color	Carbonite/silver
	VESA External Mounting	Yes (Standard 4 hole pattern, 100 mm)
	Kensington Lock-Ready	Yes
Certification and Compliance		Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, Energy Star Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Windows Certification (Microsoft® Windows® 98, Microsoft Windows 2000, and Microsoft Windows XP).
Compatibility		Compatible with platforms using the VESA standard video modes and HP Compaq Business Desktops d500, d300, and d200 Series, Compaq Evo Desktops, and HP Business Desktops d300 series.
Service and Warranty		Limited three years parts, labor, and on-site service, including backlight. Availability varies by region. Certain restrictions and exclusions apply. Consult HP Customer Service for details.

HP p1230 22-inch CRT Monitor	**Tube Type**	Diamondtron NF Aperture Grille CRT
	Picture Tube Size (diagonal)	22 in (55 cm)
	Viewable Image Area (diagonal)	20 in (51 cm)
	Aperture Grille Pitch	0.24 mm
	Screen Curvature	Flat
	Horizontal Frequency (kHz)	30 to 140 kHz

Technical Specifications

Vertical Frequency (Hz)	50 to 160 Hz
Maximum Resolution	2048 x 1536 @ 85 Hz (GTF)
Recommended Resolution	1600 x 1200 @ 85 Hz or 1280 x 1024 @ 85 Hz
Preset VESA Graphic Modes (non-interlaced)	1920 x 1440 @ 60 Hz, 75 Hz 1792 x 1344 @ 60 Hz, 75 Hz 1600 x 1200 @ 75 Hz, 85 Hz 1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz 1024 x 768 @ 75 Hz, 85 Hz 800 x 600 @ 75 Hz, 85 Hz 640 x 480 @ 60 Hz, 85 Hz
Preset MAC Mode	1152 x 870 @ 75 Hz
Preset VGA Mode	640 x 480 @ 60 Hz and 720 x 400 @ 70 Hz
Maximum Pixel Clock Speed	420 MHz
User Programmable Modes	15 (10 preset modes and 5 additional modes)
Anti-Glare	Yes
Anti-Static	Yes
Asset Control	Yes
Default Color Temperature	9300 K
Buttons or Switches	OSD menu, brigthness, contrast, Super Bright, dual input, power on/off
Languages	English, Spanish, French, German, Italian, Japanese
User Controls	Brightness, contrast, pincushion, pincushion balance, trapezoid, tilt (rotation), color temperature, degauss, parallelogram, individual color control, zoom, moiré cancellation, convergence, corner purity, image control, language, OSD control, factory reset
Plug and Play	Yes, DDC/CI compatible
Input Signal	Two 15-pin D-sub connections
Input Impedance	75 ohms
Sync Input	Separate sync (HSYNC/VSYNC)
Video Cable	Detachable 15-pin D-sub mini connector (included)
Video Cable Length	70 in (1.8 m); non-captive
Power Supply	Universal 100-120/220-240 VAC
Frequency	50/60 Hz
Maximum	135 watts
Power Saving	2 watts maximum
Off Mode	0 watts
Power Cable Length	70 in (1.8 m); non-captive

Technical Specifications

Dimensions (HxWxD)	**Unpacked** (including pedestal)	19.1 x 19.5 x 18.8 in (48.6 x 49.5 x 47.7 cm)
	Packaged	25.6 x 25.0 x 25.4 in (65.1 x 63.6 x 64.6 cm)
Weight	**Unpacked**	66.1 lb (30 kg)
	Packaged	77.1 lb (35 kg)
Tilt Range	10° upward and 5° downward	
Swivel Range	90°either side of center	
Temperature – Operating	41° to 90° F (5° to 35° C) Non-condensing	
Temperature – Non-operating	-4° to 140° F (-20° to 60° C)	
Humidity – Operating	10% to 90% non-condensing	
Humidity – Non-operating	10% to 90%	
Altitude – Operating	0 to 7,200 ft (0 to 2,195 m)	
Altitude – Non-operating	0 to 30,000 ft (0 to 9,144 m)	
Accessories Included	Power cable, video cable (D-sub to D-sub), documentation kit	
User Guide Languages	English, French, German, Spanish, Italian, Dutch, Brazilian Portuguese, Danish, Finnish, Greek, Japanese, Korean, Latin American Spanish, Norwegian, Polish, Russian, Slovenian, Turkish, Swedish, Traditional Chinese, Simplified Chinese	
Warranty Languages	English, French, Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Japanese, Korean, T. Chinese, S. Chinese	
Color	Carbon and silver	
Certification and Compliance	MPR-II (Low Emissions), TCO '03, Energy Star Compliant, UL Listing, ISO9241-3 VOT Guidelines Approval, FCC Approval, CE Mark (including PFC), GS Mark	
Compatibility	Compatible with platforms using the VESA standard video modes and HP Compaq Business Desktops d500, d300, and d200 Series, Compaq Evo Desktops, HP workstations, and HP Business Desktops d300 series.	
Warranty	Limited three-year parts and repair labor, service provider labor, and on-site service. Next business day advanced exchange direct replacement service available during warranty period. Certain restrictions and exclusions apply.	

© Copyright 2002-2004 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice.

Microsoft, Windows, and Windows NT are U.S. registered trademarks of Microsoft Corporation. Intel and Pentium are U.S. registered trademarks the Intel Corporation. All other product names mentioned herein may be trademarks of their respective companies.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.